

Programming for the Gifted

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Ministry
of
Education

The Honourable Sean Conway, Minister
George R. Poddrebarac, Deputy Minister

Writing Committee

Elizabeth King
Waterloo County Board of Education

A. A. O'Shea
Metropolitan Separate School Board

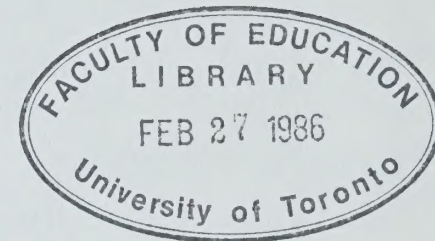
L. I. Joy Patyk
Brant County Board of Education

Len A. Popp
College of Education
Brock University

Ted Runions
Halton Board of Education

Jim Shearer
Scarborough Board of Education

Rodger T. Hendren
Special Education Branch
Ministry of Education, Ontario



The members of the writing committee and the Ministry of Education appreciate the extensive input from many special education teachers, resource teachers, and consultants of the gifted, and from the validators of this document.

Being Gifted

What does it mean?

A better mind?

Maybe just better perception of things.

Talents, abilities.

Superior?

Maybe, but maybe only in others' eyes.

Able? Yes, to a point.

Not perfect, never perfect.

Sometimes overrated, overworked.

Others overconfident in the abilities

of the gifted.

But, after all,

We're only human.

Kate Armstrong
Grade 10
Orangeville District
Secondary School

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INTRODUCTION

Gifted learners form a unique minority in all nationalities and races, in both sexes, and in all levels of society. In each gifted learner whose potential is maximized through careful nurturing, society gains a person who is capable of enriching life by sharing knowledge and skills. The inquiring and creative minds of gifted learners will contribute to the sustenance of a concerned society that depends upon "information, intelligence, and imagination".¹

The Ministry of Education,
Ontario, believes in equality of

educational opportunity for all pupils. The Formative Years and Ontario Schools: Intermediate and Senior Divisions (OSIS) reflect the policy of the Province of Ontario that the programs in the publicly supported educational system should be designed to provide the maximum opportunity for every pupil to develop as completely as possible his/her abilities and interests and to have his/her special needs and aspirations met. This document supports this policy by providing teachers with a philosophical and theoretical framework and a practical guide on which to build relevant, innovative, and cohesive special education programs for gifted pupils.

¹. From remarks by
The Honourable Bette
Stephenson, M.D., Minister of
Education/Minister of Colleges and
Universities, to the Canadian
Education Association, September
29, 1982.

Gifted/Talented Children.

Curriculum Ideas for Teachers, 1978

addressed three aspects of education of both gifted and talented pupils: identification, programming suggestions, and teaching strategies. The programming suggestions that are outlined in the 1978 document are extended in Programming For The Gifted to meet the changing needs of teachers and to accommodate the requirements for special education programs and special education services that have been legislated by the Government of Ontario.

This resource document is divided into six sections to facilitate planning for gifted pupils:

- rationale for special education programs and differentiated learning experiences for gifted pupils;

- considerations for planning differentiated learning experiences;
- affective development;
- cognitive development;
- program adaptations;
- the plan for differentiated learning experiences.

The thinking-skills strands and the inquiry or investigative models mentioned throughout this document are found in the appendices. Lesson ideas for immediate implementation are not provided in this document.

1. RATIONALE

During the past few years many teachers have gained new insights into the nature of giftedness. Teachers are encouraged to supplement their knowledge by studying the underlying reasons for differentiating learning experiences for gifted pupils. This rationale provides the basis for planning special education programs for exceptional pupils who have been identified as gifted and includes:

- societal expectations for gifted learners;
- legislation;
- definition of giftedness;
- goals of education.

1.1 SOCIETAL EXPECTATIONS

Assumptions that gifted pupils:

- will experience success on their own;

- are not exceptional and do not require special education programs and services;
- already receive all of the extra attention they need;
- form an elitist group

are being replaced by a basic philosophy that supports an educational system that provides opportunities for all pupils to develop their potential and interests to the maximum. Changes in attitudes towards gifted pupils are embodied in societal expectations that emphasize both the development of the unique qualities of all learners and their subsequent responsibility for contributing to the whole of society.

It is expected that the learners of today, including gifted pupils, will reflect qualities and display skills of:

- independent persons who are self-motivated and self-directed;
- independent learners who are methodical thinkers, inquirers, problem-solvers, and discoverers;
- interactive persons whose relationships with others are guided by personal religious-ethical beliefs, respect for cultural differences, and concern for the welfare of society;
- creative persons who are resourceful, intuitive, and productive.

While encouraging opportunities for the development of active, independent, creative, and productive people, educators and parents should

continue to advocate programs and services that meet specific physical and emotional needs, intellectual abilities, personal and specialized interests, and perceived aspirations of gifted pupils. These societal expectations should supplant those that impose extraordinary and unfair pressures on the gifted to assume the sole responsibility for the present and future conditions of the world and humanity.

1.2 LEGISLATION

Exceptional Pupils

In Ontario, the Education Act clearly makes it the responsibility of all publicly supported school systems to provide appropriate forms of education for all pupils, exceptionalities notwithstanding. In the Act an exceptional pupil is defined as "a pupil whose behavioural, communicational, intellectual, physical or multiple exceptionalities are such that he is considered to need placement in a special education program."²

2. Paragraph 21, Subsection 1.(1),
Education Act

Gifted Learners

In this context, gifted learners in Ontario are considered intellectually exceptional and are entitled to special education programs and special education services that meet their unique needs.

SPECIAL EDUCATION PROGRAMS

The Education Act defines a special education program as "an education program that is based on and modified by the results of continuous assessment and evaluation and that includes a plan containing specific objectives and an outline of educational services that meets the needs of the exceptional pupil".³

3. Paragraph 63, Subsection 1.(1), Education Act

SPECIAL EDUCATION SERVICES

The Education Act describes special education services as "facilities and resources, including support personnel and equipment, necessary for developing and implementing a special education program".⁴

4. Paragraph 64, Subsection 1.(1),
Education Act

1.3 DEFINITION

GIFTEDNESS

In the Special Education Information Handbook, the Ministry of Education has defined giftedness as:

an unusually advanced degree of general intellectual ability that requires differentiated learning experiences of a depth and breadth beyond those normally provided in the regular school program to satisfy the level of educational potential indicated (p.17).

Aesthetic talents, kinesthetic talents, and psycho-social talents are not included within the exceptionality groupings. One must remember, however, that the needs of talented learners should be accommodated. In The Formative Years the policy of the Government of Ontario indicates that it is committed to the provision of opportunities for every child "to develop as completely as possible in the direction of his or her talents and needs" (p.4).

1.4 THE GOALS OF EDUCATION

The thirteen goals set out by the Ministry of Education in Issues and Directions apply to all pupils. The goals of education sustain the underlying reasons for special education programs and services for all exceptional pupils. They provide special education teachers of gifted pupils with a starting point for planning programs.

These goals are not arranged in a specific hierarchical order. The emphasis that each goal receives will be determined by the unique characteristics and concomitant needs of gifted pupils.

The Ministry of Education strives to provide in the schools of the province equal opportunity for all. In its contribution to programs, personnel, facilities, and resources, the ministry has the overall purpose of helping individual learners achieve their potential in physical, intellectual, emotional, social, cultural, and moral development. The goals of education, therefore, consist of HELPING EACH STUDENT TO DEVELOP:

1. A RESPONSIVENESS TO THE DYNAMIC PROCESS OF LEARNING

- observing
- sensing
- inquiring
- creating
- analysing
- synthesizing
- evaluating
- communicating

2. RESOURCEFULNESS, ADAPTABILITY, AND CREATIVITY IN LEARNING AND LIVING

- modes of study
- modes of inquiry
- management of personal affairs
 - career plans
 - leisure activities
- coping with challenge
- coping with change

3. THE BASIC KNOWLEDGE AND SKILLS NEEDED TO COMPREHEND AND EXPRESS IDEAS THROUGH WORDS, NUMBERS, AND OTHER SYMBOLS

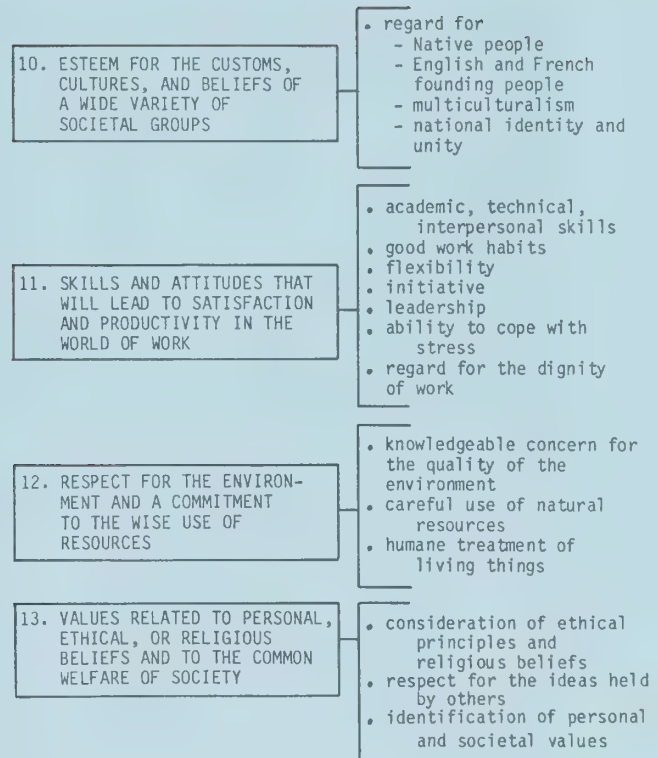
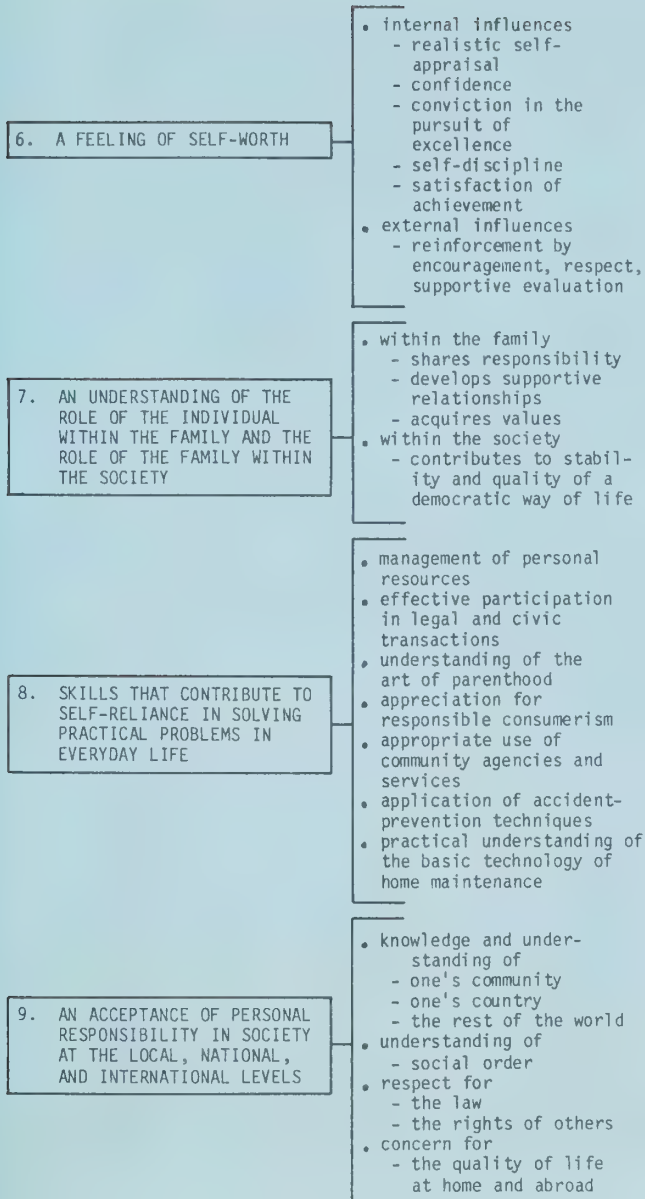
- problem-identification and problem-solving
 - apt use of language to communicate thought
 - reading, listening, and viewing with comprehension and insight
 - understanding and using mathematical operations and concepts

4. PHYSICAL FITNESS AND GOOD HEALTH

- regular physical activity
- understanding human biology
- understanding nutrition
- avoidance of health hazards
- concern for personal well-being

5. SATISFACTION FROM PARTICIPATION AND FROM SHARING THE PARTICIPATION OF OTHERS IN VARIOUS FORMS OF ARTISTIC EXPRESSION

- clarification and restructuring of personal perception and experience
- development of expressive and receptive capabilities of the learner through visual arts, music, drama, literature, and other areas of the curriculum





2. CONSIDERATIONS FOR PLANNING

During the initial stage of planning programs for gifted pupils, the teacher must consider the following:

- the general characteristics of gifted pupils;
- the potential and needs of gifted pupils;
- the general aim for program planning;
- a model for differentiating learning experiences.

2.1 CHARACTERISTICS

The following lists of characteristics of gifted pupils will provide teachers with a basic guide for:

- nomination;
- planning.

NOMINATION

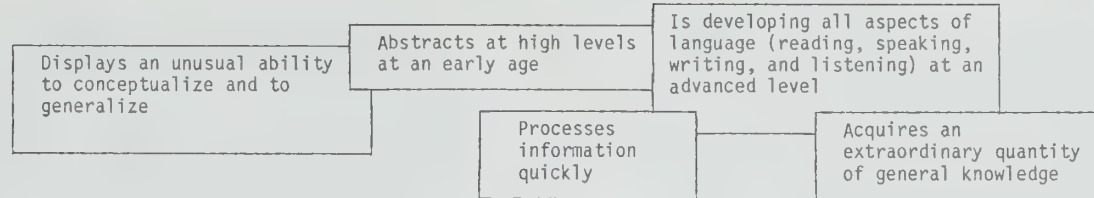
Teachers are members of

multi-disciplinary teams that have opportunities to nominate pupils to principals for consideration by Identification, Placement, and Review Committees. To be effective members of these teams, teachers must be perceptive of the global characteristics and behaviours most often displayed by a pupil "who has an unusually advanced degree of general intellectual ability".⁵ Most gifted pupils have the capacity to be powerful thinkers and inquirers, creative and productive individuals, high achievers, and sensitive people. Many of the following characteristics of gifted pupils may be evident while some may be suppressed, camouflaged, or poorly nurtured.

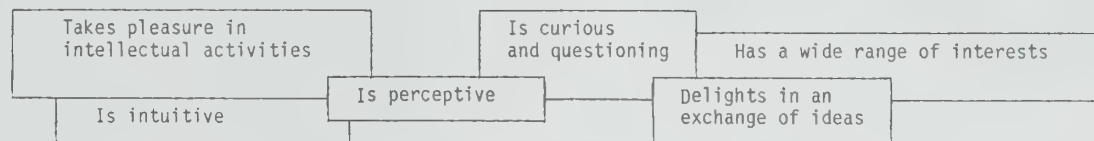
5. Ministry of Education, Ontario, Special Education Information Handbook, 1984 (Toronto: Ministry of Education, Ontario, 1984), p.17.



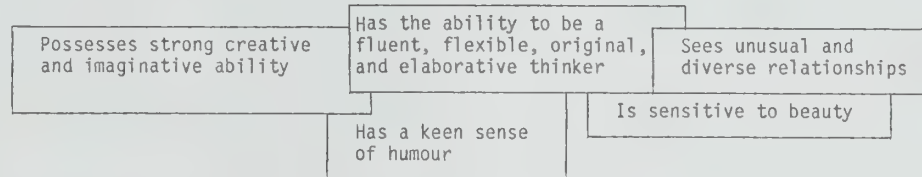
Advanced Cognitive Ability



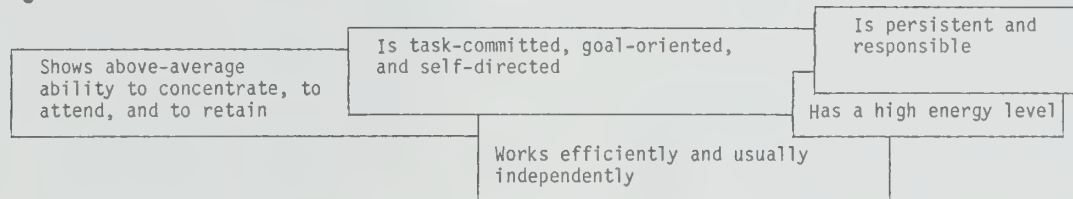
Intellectual Curiosity



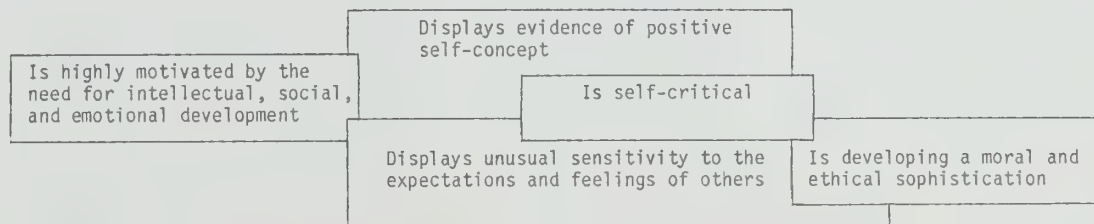
Sensitivity and Creativity



Capacity for Intense Motivation



Advanced Affective Capacity



Within the gifted population there is a variety in the way the characteristics are demonstrated by groups such as:

- achieving gifted pupils;
- underachieving gifted pupils;
- handicapped gifted pupils;
- culturally different pupils who are gifted.

Teachers must become sensitive to gifted pupils who belong to these groups when nominating pupils to principals for consideration by Identification, Placement, and Review Committees and when planning special education programs.

Achieving Gifted Pupils

Achieving gifted pupils are individuals who most often demonstrate the positive aspects of the global characteristics of gifted learners and become evident to parents and teachers at an early age. Each individual possesses his or her own unique set of characteristics that vary in number and by degree. In combination these qualities will enable the exceptional pupil within this group to be a high academic achiever and a self-directed learner.

Underachieving Gifted Pupils

Underachieving gifted pupils are individuals who appear to perform at levels below their assessed educational potential. Teachers should be aware of behaviours that may be symptoms of a variety of basic personal and social

problems that often camouflage giftedness. Underachieving gifted pupils sometimes exhibit the negative aspects of the global set of characteristics of gifted learners such as low self-esteem, irresponsibility towards self, dislike of school, hostility towards authority, apparent rebellion, poor motivation, underdeveloped academic skills, and low aspirations and goals. They have fewer interests, are less persistent, appear to be less adaptive, and are less popular than some of their peers. Pupils within this group do not perform well in school-related tasks, and consequently, teachers are reluctant to recommend them for consideration for special education programs for gifted learners. It is important to

understand the characteristics of these pupils, to interpret accurately their unconventional behaviour, and to search beneath the façade they create in order not to deny them the opportunity to be included in programs for gifted pupils that may help them to develop as creative, productive members of society.

Handicapped Gifted Pupils

Handicapped gifted pupils are individuals who may be within the multiple exceptionality grouping. "Multihandicap" is defined by the Ministry of Education as "a combination of learning or other disorders, impairments, or physical handicaps, that is of such nature as to require, for educational achievement, the services of one or more teachers holding qualifications

in special education and the provision of support services appropriate for such disorders, impairments, or handicaps".⁶ Often the handicaps or impairments are emphasized, and teachers fail to recognize the intellectual abilities and potentials of the learners. Behaviours that reflect the global set of characteristics of gifted learners may be masked by the handicap. Teachers must look beyond the handicap or impairment to find the characteristics that may assist an Identification, Placement, and Review Committee to accurately identify the needs of and appropriately place a handicapped gifted pupil.

6. Ibid., p.18.

Culturally Different Gifted Pupils

Culturally different pupils who are gifted are those individuals who may or may not differ significantly from the dominant culture in values, attitudes, and opportunities. Because of language diversity, these pupils may be slower to develop and display strengths or may repress evidence of their abilities. Teachers can become aware of culturally different pupils by observing characteristics such as advanced mathematical ability, logical-thinking ability, analogical-thinking ability, and the ability to transfer knowledge to new situations or to new applications.

PLANNING

Effective learning is the result of thoughtful planning. Planning is concerned with who, why, what, how, and how well. The Education Act requires special education programs to be based on the results of continuous assessment and evaluation. The information gathered through the processes of assessment and evaluation should reveal the needs, abilities, interests, and aspirations of the learner. The specific needs of each learner embrace his/her unique characteristics.

The initial stage for planning a special education program for a gifted pupil involves:

- observation of the pupil's behaviours;

- recognition of the pupil's unique characteristics;
- identification of the pupil's concomitant needs.



2.2 POTENTIAL AND CONCOMITANT NEEDS

Gifted pupils have the potential to become active, independent, creative and productive people. The characteristics that foster creativity and independence must be nurtured during learning experiences.

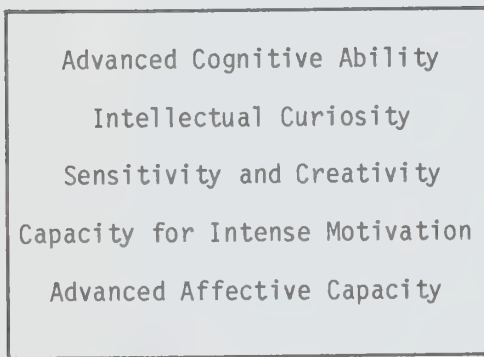
The breadth of learning experiences will require gifted pupils to interact with others within their societies. The characteristics that foster interaction and ultimately interdependence must be nurtured as well.

The following chart illustrates the relationship between the general characteristics of giftedness and the

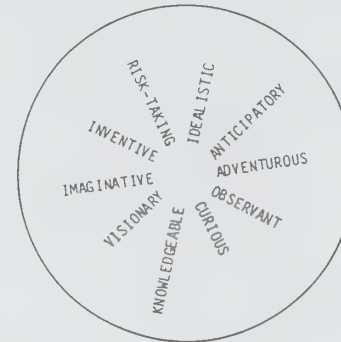
specific characteristics of potentially creative, independent, and interdependent people and links the characteristics to the concomitant needs of gifted pupils.

POTENTIAL

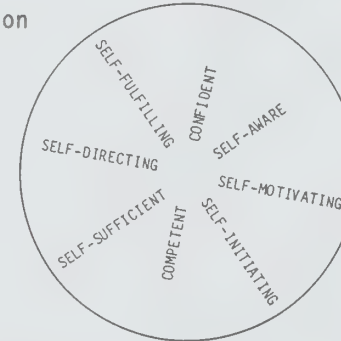
CHARACTERISTICS



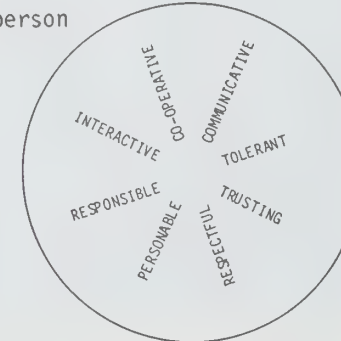
Creative Person



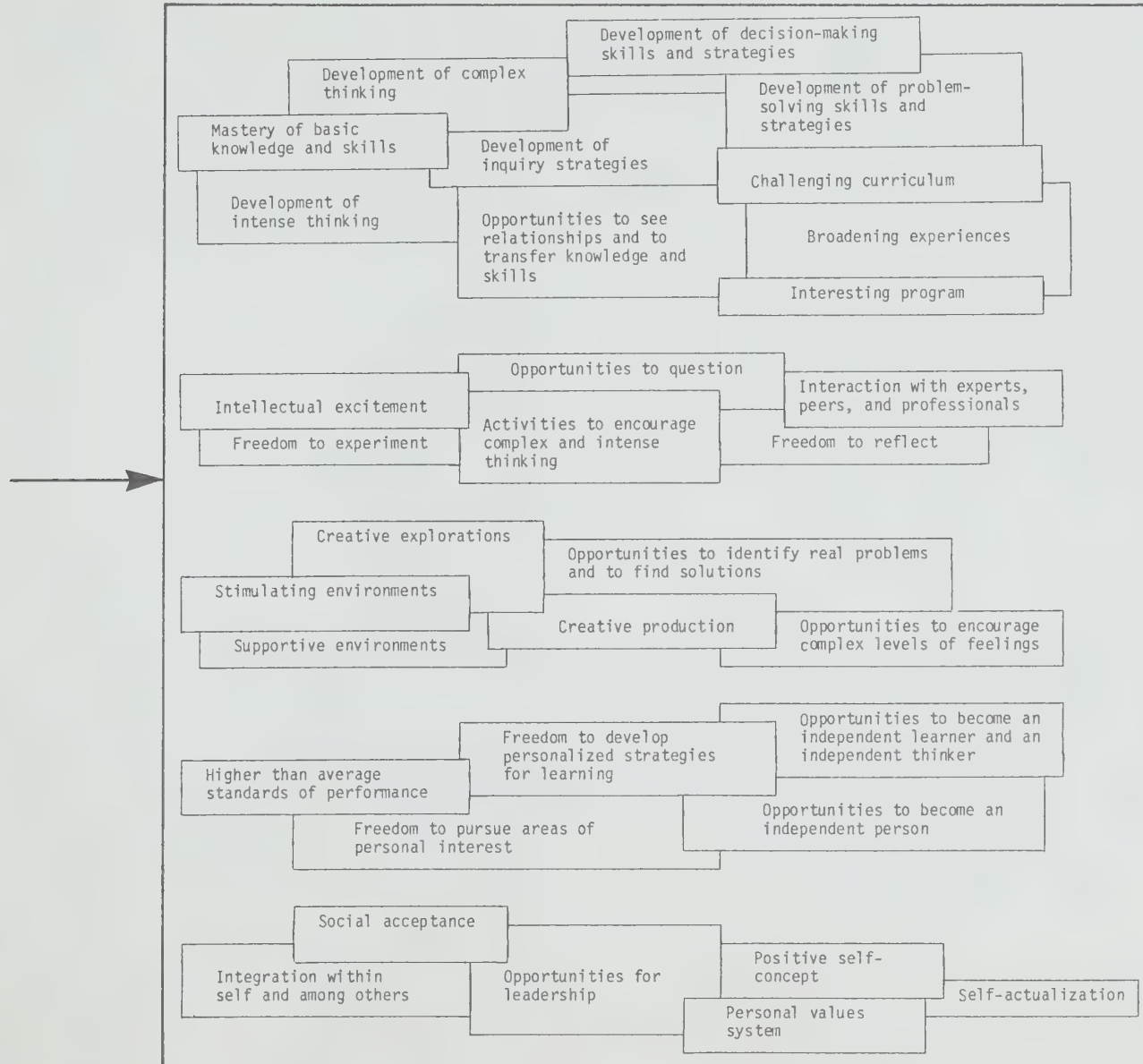
Independent person



Interdependent person



CONCOMITANT NEEDS



CONCOMITANT NEEDS

Teachers are encouraged to expand the general statements of concomitant needs and to design a checklist that will facilitate the assessment of the needs of the pupil. The checklist should be an integral part of a planning guide. The assessment forms the basis for selecting themes, issues, or problems and for formulating objectives for the development of content, cognitive and affective processes, products, and evaluation strategies.

2.3 AIM

An educational aim provides teachers with a focus for planning. For gifted pupils, the aim is determined by an analysis and synthesis of:

- the expectations and realities of the community and society;
- the legislation and definition of giftedness;
- the goals of education for all pupils in Ontario.

The aim must be tempered with consideration of:

- the global characteristics of gifted pupils;
- the potential of gifted pupils to be creative, independent, and ultimately interdependent people;

- the concomitant needs of the pupil as a gifted learner.

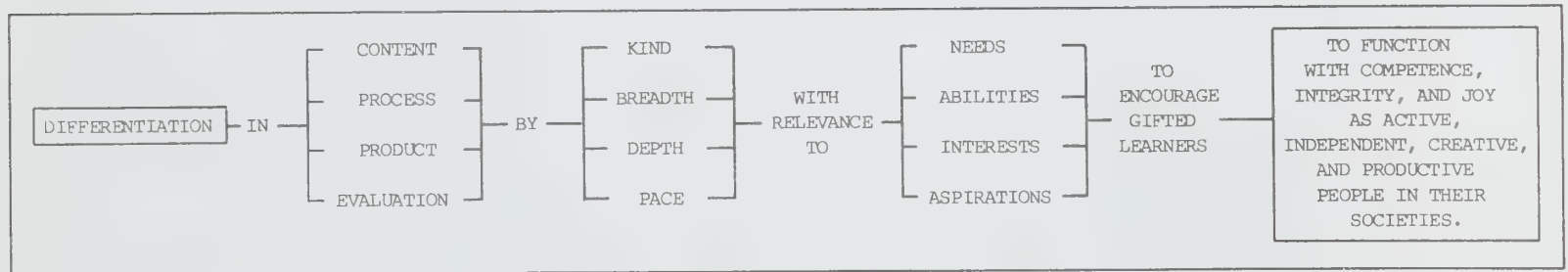
The following aim may be adapted or modified through a consideration of the philosophy, policies, programs, and services for exceptional pupils within school boards. The aim is basic to the formulation of specific objectives that will guide teachers in planning learning experiences that are differentiated for gifted pupils.

TO ENCOURAGE GIFTED LEARNERS TO FUNCTION WITH COMPETENCE, INTEGRITY, AND JOY, AS ACTIVE, INDEPENDENT, CREATIVE, AND PRODUCTIVE PEOPLE IN THEIR SOCIETIES.

2.4 LEARNING EXPERIENCES AND DIFFERENTIATION

The information included in the matrix on page 31 is for consideration when planning "differentiated learning experiences of a depth and breadth beyond those normally provided in the regular school program".⁷ The following chart provides the

rationale for the structure of the matrix. Four major components of a learning experience - content, process, product and evaluation - are suggested, and each component can be differentiated in four dimensions - kind, breadth, depth, and pace.



7. Ibid., p.17.

CONTENT

The content of a learning experience is the subject matter or knowledge that is to be acquired, investigated, or manipulated. Gifted learners should have experiences that encourage them to handle knowledge at their levels of ability by:

- using their extraordinary quantities of facts and concepts to develop powerful generalizations;
- mentally manipulating facts, concepts, or generalizations to formulate theories.

A fact is knowledge that is true. It is based on reality, or it really happened.

A concept is knowledge that is a general notion. It brings order to a set of facts.

A generalization is a general statement, law, principle, or proposition that states a relationship among similar, but not identical concepts.

A theory is knowledge that explains the facts, concepts, or generalizations that have been tested or confirmed. It explains a large number of related facts, occurrences, or other phenomena.

The content of learning experiences evolves from broad-based issues, problems, or themes. It should be based on the needs, abilities, interests, and aspirations of the learner and reflect the intent of The Formative Years or Ontario Schools: Intermediate and Senior Divisions.

The following are examples of:

- a broad-based issue - "Nuclear Disarmament";
- a broad-based problem - "Pollution";
- a broad-based theme - "Courage".

The breadth of the learning experience encourages the learner to investigate the content from many directions as a multidisciplinary study. For example, the problem

"Pollution" can involve aspects of ecology, politics, biology, economics, history, and mathematics, among others. Gifted pupils can acquire a multitude of facts and concepts from each of the disciplines and, from these facts and concepts, formulate powerful generalizations, defensible conclusions and creative solutions to the problem of "Pollution".

The breadth of the study will provide a variety of sub-topics within combined disciplines or a sub-topic within one discipline from which the gifted learner can select a focus for an in-depth study. The depth of the learning experience provides the pupil with an opportunity to specialize in his/her area of interest.

The pace for acquiring, investigating, or manipulating facts, concepts, generalizations, or theories will be determined by the scope of the study and by the depth to which each learner investigates his/her interest. Pacing may be fast or slow, and planning must be flexible to accommodate this dimension.

PROCESS

The content is the vehicle for developing, reinforcing, or applying cognitive processes. For the purposes of this document the cognitive processes include thinking skills and their applications to inquiry or investigative models. Thinking skills are composed of two major categories - basic and integrated - and should be considered as information organizers that can be utilized within the structure of investigative models.

The skills and models are structured in detail in the Appendices, pages 125 to 145.

The breadth of the cognitive process is demonstrated through the acquisition of basic investigative models that can be utilized during the study of broad-based issues, problems, or themes. The basic models can be modified to accommodate diversity in a study. Following the acquisition of a repertoire of skills and models in the context of the school, the pupils and teachers can plan experiences with opportunities to apply the models to real-life situations. As the pupils investigate a variety of issues, problems, and themes and develop and apply appropriate models to the situations beyond the regular program, they acquire their own systems for learning.

Cognitive processes of a learning experience can be differentiated by depth. The depth of thinking is the quality or intensity of the intellectual process. Bloom's taxonomy is frequently used by teachers as an organizing framework for planning activities that will require levels of thinking commensurate with intellectual abilities (see Appendix F, p. 146. The basic and integrated thinking skills that are suggested on pages 61 to 68 are structured on growth strands. Each growth strand indicates the successive levels of the thinking skill. As the learner advances through a growth strand, he/she will be required to think at a more intense level and will gain greater insight into the application of the skill to investigative models and strategies. Consequently, through the depth of thinking, the learner will have more flexibility and more

control over his/her own system of learning.

PRODUCTS

Products are integral components of learning experiences and can be differentiated for gifted pupils by kind, breadth, depth, and pace. In this document there are two types of products - tangible and intangible. The tangible products relate to the content and are produced through the creative application of a variety of technical skills (see page 34).

The intangible products are those that result from both cognitive and affective development. The intangible products that result from cognitive development are evident through the pupil's ability to apply, increasingly and independently, thinking skills and investigative models to issues, problems, and themes that go

beyond the regular curriculum. The intangible products that result from affective development become evident through changes in behaviour. These changes are the products of the pupil's interactions with and reactions to:

- peers,
- teachers,
- resources,
- learning settings and environments,
- programs.

See pages 37 to 55.

EVALUATION

Evaluation is the fourth component of learning experiences and should be differentiated to meet the unique needs of gifted learners. Gifted pupils are often self-critical and sensitive to the expectations and feelings of others. Their achievements should be evaluated by others who feel comfortable with gifted

learners and who understand and appreciate their unique qualities.

Self-evaluation will encourage pupils to examine their strengths and weaknesses in an unthreatening way. Self-evaluation will lead them to appreciate their own personalized way of learning and to assess the degree to which they have mastered their own systems of learning. They will be motivated to extend their strengths and their "gifts" into new and creative endeavours that will meet their interests and their aspirations.

The suggestions and information in all cells of the matrix that follows are not necessary for all gifted pupils at all times. Only those cells that are appropriate for differentiation at a particular time should be considered.



DIFFERENTIATION MATRIX

BEYOND	CONTENT	PROCESS	PRODUCT	EVALUATION
KIND	Knowledge (facts, concepts, generalizations, and theories) that is related to broad-based issues, problems, and themes, and that is appropriate to the learner's needs, abilities, interests, and aspirations	Thinking skills (see pages 125 to 133) Inquiry models (see pages 134 to 145) Personalized models Technical skills that relate to the content	Tangible - creative - dynamic - reflecting excellence and integrity Intangible - anticipatory - cognitive development - affective development	Teacher-evaluation Co-evaluation pupil - teacher pupil - peer pupil - community resource person Self-evaluation
BREADTH	Divergent in scope Multidisciplinary Generalized	Complexity of thinking - acquisition and application of specialized models (see pages 136 to 145) and advanced technical skills Elaborative Extrinsic - interpersonal and interdependent	Tangible - creative - speculative - interdependent - participatory - contributory	Co-evaluation pupil - teacher pupil - peer pupil - community
DEPTH	Convergent in focus Intense interest Strong commitment Specialized	Intensity of thinking - acquisition and application of high levels of thinking (see pages 125 to 133) leading to sophisticated information organizers and personalized models Intrinsic - self directing - original	Intangible - self-actualization - competence - integrity - joy - independent - thinker - learner	Self-evaluation Reflective
PACE	Determined by the degree of competence, comfort, and commitment Personalized	Determined by the degree to which basic skills and models have been acquired and directed towards the development of personalized models that result in independent thinking and learning	Anticipatory Determined by opportunities to apply knowledge, skills, and affects to new situations	Continuous - co-evaluation - self-evaluation Evocative

GROWTH THROUGH
KNOWLEDGE

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GROWTH THROUGH
SKILLS

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GROWTH THROUGH
PRODUCTION

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GROWTH THROUGH
SUPPORT

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Differentiated
Learning
Experiences
for
Growth

DIFFERENTIATING CONTENT

	CONTENT	The content of a learning experience is the subject matter to be acquired, investigated, or manipulated by the learner and is the vehicle for developing cognitive processes.			
KIND	Knowledge (facts, concepts, generalizations, and theories) that is related to broad-based issues, problems, and themes, and that is appropriate to the learner's needs, abilities, interests, and aspirations	The holistic approach to learning is encouraged through the selection of broad-based issues, problems, or themes.	The selection of the content must reflect the intent of The Formative Years or Ontario Schools: Intermediate and Senior Divisions. Provisions are made in each curriculum guideline for the Intermediate and Senior divisions for modifications for exceptional pupils.		
BREADTH	Divergent in scope Multidisciplinary Generalized	The breadth of the issue, problem, or theme will permit divergency and diversity in program planning	Gifted pupils acquire vast quantities of facts and concepts from many disciplines. Opportunities must be provided for pupils to formulate generalizations and theories from their knowledge of facts and concepts.	Basic and integrated thinking skills are available to pupils as information organizers. Basic models encourage pupils to use their thinking skills when organizing their investigations to help them: • arrive at conclusions; • express conclusions; • evaluate conclusions.	The pupils, from many perspectives, form generalized conclusions from a theme, find a generalized solution to a problem, or make a generalized decision about an issue.
DEPTH	Convergent in focus Intense interest Strong commitment Specialized	and should lead to convergency in the selection and treatment of a specific or specialized topic that meets the interests and aspirations of the pupil.	Gifted pupils may acquire vast quantities of facts and concepts from one discipline or from one aspect of many disciplines. From this specialized focus the pupils can formulate specific generalizations and develop specific theories.	The strands for basic and integrated thinking skills indicate levels of sophistication for organizing information. Higher levels of sophistication demand more intense thinking. Sophisticated information organizers and intense thinking necessitate specialized models for the development of powerful generalizations and conclusions.	The pupils, from one perspective, form a specific conclusion from a specialized theme, find a specific solution to a specialized problem, or make a specific decision about a specialized issue.
PACE	Determined by the degree of competence, comfort, and commitment Personalized	The pacing may be fast or slow depending upon the scope and complexity of the study and the focus and intensity of the investigation.			

DIFFERENTIATING PROCESS

	PROCESS	The processes of a learning experience include the thinking skills and their applications to investigative strategies or inquiry models.																				
KIND	Thinking skills (see pages 125 to 133) Inquiry models (see pages 134 to 145) Personalized models Technical skills that relate to the content	<u>Basic Thinking Skills</u> <ul style="list-style-type: none">• Observation• Correspondence• Classification• Seriation	<u>Integrated Thinking Skills</u> <ul style="list-style-type: none">• Logical Multiplication• Compensatory Thinking• Proportional Thinking• Probabilistic Thinking• Correlational Thinking	<u>Basic Models</u> <ul style="list-style-type: none">• Basic Inquiry Model• Basic Problem-Solving Model• Basic Decision Model	<u>Specialized Models</u> <ul style="list-style-type: none">• Physical-Science Model• Randomization Model• Case-Study Model• Correlational Model• Logic Model• Math. Problem-Solving Model• Critical-Reading Model• Descriptive-Writing Model• Narrative-Writing Model• Essay-Writing Model																	
BREADTH	Complexity of thinking - acquisition and application of specialized models (see pages 136 to 145) and advanced technical skills (page 145) Elaborative Extrinsic - interpersonal and interdependent	The breadth of the learning experience encourages a multi-disciplinary approach to planning and an interdisciplinary approach to learning. Each discipline may require the development and utilization of a basic or specialized model. The synthesis of the conclusions from all disciplines requires very complex thinking. Example → (Broad-based problem) → "Pollution"				<table><tr><td>Discipline</td><td>Basic or Specialized Model</td></tr><tr><td>Ecology</td><td>Physical-Science Model</td></tr><tr><td>Politics</td><td>Critical-Reading Model</td></tr><tr><td>Economics</td><td>Randomization</td></tr><tr><td>History</td><td>Basic Inquiry Model</td></tr><tr><td>Mathematics</td><td>Math. Problem-Solving Model</td></tr><tr><td>Synthesis</td><td>Essay-Writing Model</td></tr><tr><td>Product</td><td>Technical-Skills (Videotape)</td></tr></table>	Discipline	Basic or Specialized Model	Ecology	Physical-Science Model	Politics	Critical-Reading Model	Economics	Randomization	History	Basic Inquiry Model	Mathematics	Math. Problem-Solving Model	Synthesis	Essay-Writing Model	Product	Technical-Skills (Videotape)
Discipline	Basic or Specialized Model																					
Ecology	Physical-Science Model																					
Politics	Critical-Reading Model																					
Economics	Randomization																					
History	Basic Inquiry Model																					
Mathematics	Math. Problem-Solving Model																					
Synthesis	Essay-Writing Model																					
Product	Technical-Skills (Videotape)																					
DEPTH	Intensity of thinking - acquisition and application of high levels of thinking (see pages 125 to 133) leading to sophisticated information organizers and personalized models Intrinsic - self-directing - original	Frameworks for information organization extend from pictures, through diagrams and flowcharts to organizers based on classification, seriation, correlation, etc. Gifted learners should be encouraged to use sophisticated organizers and to apply them to specialized models. For example, the lowest level of classification requires the learner to determine whether a particular object belongs in a defined class. A high-level classification skill is the ability of the learner to construct and/or interpret a Venn diagram, a cross-classification chart, or a tree diagram. The high-level classification skills are applied in many of the specialized investigative models.																				
PACE	Determined by the degree to which basic skills and models have been acquired and directed towards the development of personalized models that result in independent thinking and learning	As the pupil masters each basic or integrated thinking skill and acquires or utilizes each investigative strategy, he/she extends his/her expertise as an independent thinker and learner. The degree of independence is demonstrated as the pupil generates his/her own modifications of the basic and specialized models to meet new issues, problems or themes.																				

DIFFERENTIATING PRODUCT

	PRODUCT	The products of learning experiences are the expected outcomes. All outcomes should be both tangible and intangible, reflecting cognitive and affective growth, and should be planned to query existing ideas and demonstrate new ideas.
KIND	<p>Tangible</p> <ul style="list-style-type: none"> - creative - dynamic - reflecting excellence and integrity <p>Intangible</p> <ul style="list-style-type: none"> - anticipatory - cognitive development - affective development 	<p>Tangible outcomes are concrete in form and are produced by the learner for designated audiences:</p> <ul style="list-style-type: none"> • the pupil himself/herself; • peers; • other pupils; • the teacher; • other professionals; • the public. <p>→ the pupil's society</p> <p>Intangible outcomes are produced through affective development and result in personal growth of:</p> <ul style="list-style-type: none"> • feelings; • attitudes; • beliefs; • values; • traits.
BREADTH	<p>Tangible</p> <ul style="list-style-type: none"> - creative - speculative - interdependent - participatory - contributory 	<p>Gifted pupils should be afforded freedom to design and present tangible products that go beyond those of the regular program and that meet many of the criteria to the left. This may require the acquisition of advanced technical skills that are unfamiliar. The development of these skills can form the basis for new differentiated learning experiences.</p> <p>(Broad-based problem) "Pollution" → Product Videotape → Advanced Technical Skills Synchronization of visual and auditory elements of the presentation</p>
DEPTH	<p>Intangible</p> <ul style="list-style-type: none"> - self-actualization - competence - integrity - joy - independent - thinker - learner 	<p>Intangible products, such as thinking clearly, feeling deeply, and acting wisely, should be the result of the integration of cognitive and affective development.</p> <p>Intangible products, that result from cognitive development, will be demonstrated through independent, creative, and productive thinking. The products that result from affective growth in a trusting, sharing, and supportive learning environment in which the pupil and teacher are co-learners will reflect self-actualization.</p>
PACE	<p>Anticipatory</p> <p>Determined by opportunities to apply knowledge, skills, and affects to new situations</p>	<p>The pacing of tangible-product development will be influenced by:</p> <ul style="list-style-type: none"> • the complexity of the product; • the pupil's familiarity and expertise with advanced technical skills; • the pupil's level of mastery of cognitive skills; • the pupil's level of affective development. <p>The pacing of intangible-product development will be determined by opportunities for gifted learners to transfer their cognitive and affective skills to new situations.</p>

DIFFERENTIATING EVALUATION

DIFFERENTIATING EVALUATION				
	EVALUATION	Assessment is the collection of data using a variety of instruments. Evaluation is the synthesis of the data. It provides the basis for decision-making about the pupil's performance in content acquisition, process utilization, and product development in relation to educational goals, aims, and objectives.		
KIND	Teacher-evaluation Co-evaluation pupil - teacher pupil - peer pupil - community resource person Self-evaluation	Assessment and evaluation must involve both the pupils themselves and others. As the pupils gain experience in evaluation by others, they learn more about their achievements and weaknesses, their abilities, interests, and aspirations. They learn also, either directly or indirectly, about assessment and evaluation techniques. The transition of the teacher from evaluator, to the pupil and teacher as co-evaluators, to the pupil as self-evaluator parallels a basic movement of the teacher from instructor, to the pupil and teacher as co-learners, to the teacher as facilitator and the pupil as an independent learner. As an instructor, the teacher selects the assessment instruments and develops the evaluation criteria. As an independent learner, the pupil selects the assessment instruments and establishes the criteria.		
BREADTH	Co-evaluation pupil - teacher pupil - peer pupil - community	Assessment and Evaluation of Content	Assessment and Evaluation of Process	Assessment and Evaluation of Product
		<u>Content:</u> Acquisition of facts and concepts and the formula-tion of generalizations and theories from many di-sciplines.	<u>Process:</u> Utilization of basic and specialized models as required by the inter-relationship of facts and concepts of the content.	<u>Product:</u> Tangible product resulting from the integration of the content and processes - to be shared with others.
		Assessment instruments - usually selected and designed by the teacher Standards and criteria - teacher-selected Evaluation - by teacher	<div><div>- observation</div><div>- rating scales</div><div>- inventories</div><div>- checklists</div><div>- questionnaires</div><div>- interviews</div><div>- tests and examinations</div></div>	Assessment instruments - usually selected and designed by the teacher Standards and criteria - teacher, or teacher-and-pupil-selected Evaluation - by teacher <div><div>-checklists</div><div>-rating scales</div></div>
DEPTH	Self-evaluation Reflective	<u>Content:</u> Acquisition of facts and concepts and the formula-tion of generalizations and theories from a personal interest	<u>Process:</u> Application of higher levels of thinking (sophisticated information organizers) to the development of personal investigative strategies	<u>Product:</u> Intangible products - personal growth through the integration of affective and cognitive development
		The breadth of evaluation involves others as evaluators. The depth of evaluation should involve other evaluators but the evaluation process should be assumed gradually by the pupil as he/she becomes an independent learner. Self-evaluation depends upon the pupil's feeling of self-worth. A feeling of self-worth will determine the degree of sophistication of the standards and criteria and the application of these to the performance. Assessment instruments - should show a transition from teacher-selected to co-selected to self-selected Standards and criteria - teacher-selected, co-selected, self-selected Evaluation - by teacher, by teacher and pupil, by pupil		
PACE	Continuous - co-evaluation - self-evaluation Evocative	For all pupils, assessment and evaluation should be continuous. The teacher, as facilitator, must be constantly aware of a gifted pupil's intense search to give meaning to his/her values system. Continuous assessment and evaluation should both measure the pupil's performance and provide the gifted learner with support and encouragement to strive to meet his/her need for self-actualization and a feeling of self-worth as an independent, creative, and productive person.		



3. AFFECTIVE DEVELOPMENT

Gifted pupils differ from other pupils in:

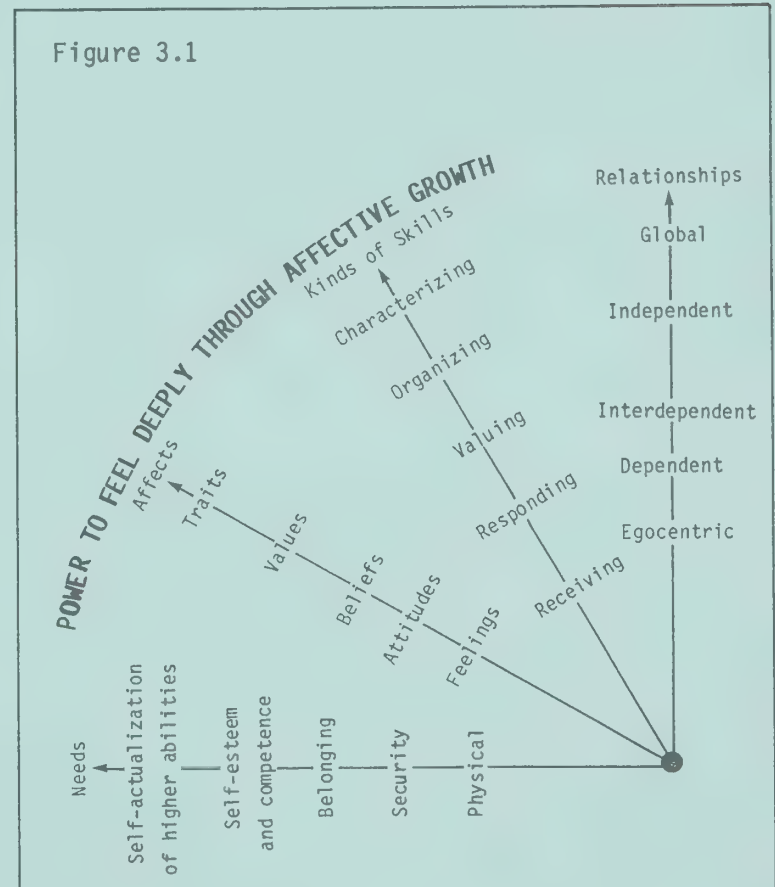
- advanced cognitive ability;
- intellectual curiosity;
- sensitivity and creativity;
- capacity for intense motivation;
- advanced affective capacity.

The potential for advanced affective development can be nurtured through learning experiences that are based on:

- knowledge of needs, affects, skills, relationships;
- a learning environment that is conducive to affective growth;
- a plan for a conscious acquisition and an active application of affective skills.

3.1 NEEDS, AFFECTS, SKILLS, AND RELATIONSHIPS

Figure 3.1



NEEDS

A fundamental condition for learning is the satisfaction of the basic needs of the learner. Abraham H. Maslow, in Motivation and Personality⁸, provides educators with a list of five categories of basic needs that should be considered when planning and implementing programs for all pupils. Because of the advanced affective capacity of gifted learners, these pupils should be provided with learning experiences that are differentiated to meet their higher-level affective needs.

Physiological Drives or Needs

These needs must be gratified before the learner is capable of or motivated to meet other needs.

8. Abraham H. Maslow, Motivation and Personality. 2nd ed. (New York: Harper and Row, 1954).

Safety Needs

Security, stability, dependency, protection, and freedom from fear, anxiety, and chaos are some of the basic safety needs. Advanced cognitive ability and intellectual curiosity notwithstanding, gifted learners have a preference for a safe, orderly, predictable, lawful, and organized environment.

Belongingness and Love Needs

All learners have a basic hunger for affective relationships with people. Because of their unique differences gifted pupils may be alienated by others. They have a strong desire to overcome feelings of aloneness, strangeness, and loneliness. They need to belong to groups for healthy

social and emotional growth and to groups of their intellectual peers for stimulation and challenge.

Esteem Needs

All pupils have a desire for a firmly based and stable evaluation of themselves, for self-respect and self-esteem. The desire for achievement, for adequacy, for mastery and competence, for confidence, and for independence and freedom must be considered when planning the products and evaluation components of learning experiences for gifted pupils. Satisfaction of these needs will produce feelings of self-confidence, worth, strength, capability, and adequacy and will lead to a feeling of being useful and necessary in society.

Need for Self-Actualization

The need for self-actualization is manifested in the pupil's desire to be at peace with himself/herself. This intangible product is the fulfillment of potential and attainment of aspirations. For gifted pupils, this implies that the breadth and depth of the content, the process, the product, and the evaluation of learning experiences must be planned to satisfy this need.

AFFECTS

Gifted learners display an unusual ability to conceptualize and to generalize. This ability is evident in the pupil's early development of a sophisticated personal values system that is his/her attempt to deal with affective needs.

The affects include:

feelings: pleasant or painful states, likes or dislikes that are produced in a person in reaction to stimuli and are not based solely on reason;

attitudes: conscious positions with regard to facts or states;

beliefs: acceptance of the truth of statements based on an examination of

facts. The acceptance can be through either faith that is the result of one's trust in a person or thing, or conviction that is the result of being convinced by someone or something;

values: established ideals of life;

traits: distinguishing features or characteristics of person's total approach to life.

Affective development appears to occur on a continuum:

- growing from feelings to attitudes;
- synthesizing attitudes to develop beliefs;
- internalizing beliefs to formulate values;

- demonstrating values through traits.

KINDS OF SKILLS

This development corresponds to the classification of objectives in the affective domain by David R. Krathwohl, Benjamin S. Bloom, and Bertram B. Masia.⁹ Their taxonomy includes five categories.

Receiving

The pupil brings a point of view to a new learning experience from his/her rudimentary values system. At this level of development the teacher sensitizes the learner to the existence of

phenomena and stimuli of the new situation through three levels of receiving:

- an awareness of a situation, phenomenon, object, or state of affairs;
- a willingness to receive, accept, or tolerate a given stimulus;
- a control of the attention at a conscious or semi-conscious state in order to select the favoured stimulus from many stimuli.

Responding

The pupil reacts to a subject, phenomenon, or activity through interests and commitment and this action leads to future participation.

There are three levels of responding:

9. David R. Krathwohl, B. S. Bloom, B. B. Masia, Taxonomy of Educational Objectives, Handbook II: Affective Domain (New York: David McKay Co. Inc., 1964).

- acquiescence in responding when the pupil reacts by complying without fully accepting the reasons for responding to a suggestion;
- willingness to respond when the pupil voluntarily reacts;
- satisfaction in response when the pupil receives, finds, or takes pleasure and joy from the experience.

Valuing

The pupil's behaviour reflects his/her commitment to his/her values. This display of consistent behaviour may be perceived as resulting from an attitude or belief. In this taxonomy, there are three levels of valuing:

- acceptance of a value through the willingness to be identified with it;

- preference for a value by wanting and pursuing it;
- commitment to a value through conviction, loyalty, and an intense motivation to further the things valued by convincing others.

Organization

As a pupil encounters situations for which several values are relevant, he/she organizes the values into a system, determines how they are inter-related, and establishes which are the dominant and pervasive ones. There are two sub-categories within this category:

- conceptualization of the value involving the addition of the quality of abstraction to the value. This assists the pupil to see relationships between old and new values;

- organization of a values system requiring the learner to bring values together into an ordered relationship that may form a philosophy of life. The synthesis of many values may provide a new value system of a higher order.

Characterization

At this level the pupil has developed and internalized a sophisticated values system and consistently acts in accordance with these values. Two aspects constitute the sub-categories of characterization:

- a generalized set of values enables the pupil to order his/her world and to act consistently in it. The pupil can be described or characterized through his/her consistent behaviour;

- an integration of the pupil's beliefs, ideas, and attitudes into a total philosophy or world view.

RELATIONSHIPS

The responsibility for the education of a gifted pupil is shared by family, school, community, and the learners. As the child moves into adulthood he/she grows emotionally and morally as well as intellectually, physically, socially, and culturally. Affects can be acquired consciously and subconsciously through interaction with different people in a variety of settings. The number, kind, and quality of these relationships change as the child matures. Barbara Clark, in her book Growing Up Gifted, suggests:

The early appearance of social conscience that often characterizes gifted children signals an earlier need for development of a value structure and for the opportunity to translate values into social action. This can occur in the context of the society of the classroom and should then be extended into the larger world, as appropriate to the child's increasing competence and widening concerns.¹⁰

As the pupil acquires both affective and cognitive skills, and as he/she is provided with an appropriate learning environment, he/she grows from an egocentric and dependent person to one who can interact positively

with others. The realization of the need for both the pupil and the teacher to contribute to the achievement of the goals of education and the aim for gifted pupils results in a balanced interdependent relationship. During this relationship the pupil is encouraged to acquire knowledge, skills, and affects to help him/her become an independent learner and thinker. The creative products of independent thinking and learning should be shared with others within his/her extended or global society.

10. Barbara Clark, Growing Up Gifted. (Columbus, Ohio: Charles E. Merrill Publishing Co., 1979), p.26.

3.2 THE LEARNING ENVIRONMENT AND AFFECTIVE DEVELOPMENT

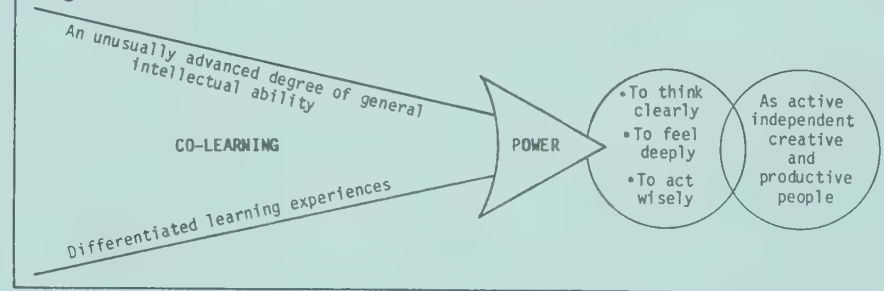
Values education is rooted in human interaction in the classroom and in the social climate of the school at large. In fact, it is not possible for schools to be value-free or morally neutral because schools are communities of people, teachers and students, who, in turn, are part of the larger community. Because values underlie and govern personal action, the value systems of schools are affected by the values of the people who have influence in them.¹¹

For gifted pupils, the quality of the learning environment is determined by:

- the degree of interdependence of the pupil and teacher as co-learners;
- the qualities of the teacher as a co-learner;
- the partnerships within the learning environment;
- the setting for learning.

11. Ministry of Education, Ontario, Personal and Societal Values: A Resource Guide for the Primary and Junior Divisions (Toronto: Ministry of Education, Ontario, 1983), p.8.

Figure 3.2



CO-LEARNING

Pupils who have an advanced degree of general intellectual ability and who require differentiated learning experiences can be introduced to the co-learning strategy.

Co-learning is a facilitative framework on which to build mutually supportive interactions between the teacher and the gifted pupil. It provides opportunities for:

- co-planning, co-implementing, and co-evaluating innovative learning experiences;
- individualizing programs in response to the unique set of characteristics of the learners, to their affective and cognitive needs, and to their abilities, interests, and aspirations;
- nurturing affective growth and the development and utilization of thinking skills and inquiry

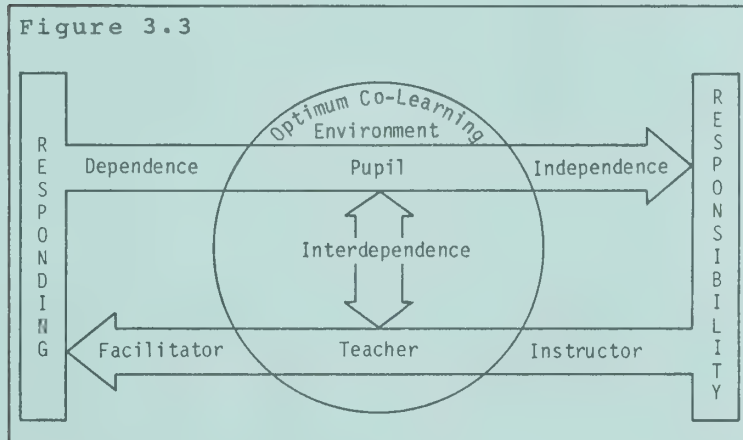
models to encourage self-motivation, self-direction, and self-evaluation;

- accepting and assuming responsibility for independence and independent learning.

In the co-learning environment of the school, the interactive roles of the teacher and the pupils are often modified. Through the acquisition of appropriate knowledge, skills, and affects the pupil is encouraged to grow from a dependent person who responds only to instruction to an independent learner who accepts responsibility for learning.

The teacher, as a participant in co-learning, acknowledges and accepts the unique qualities of gifted pupils. Over a period of time the

teacher systematically relinquishes some of the responsibilities that are associated with the traditional role of the teacher as instructor and assumes a new posture as facilitator and co-learner.



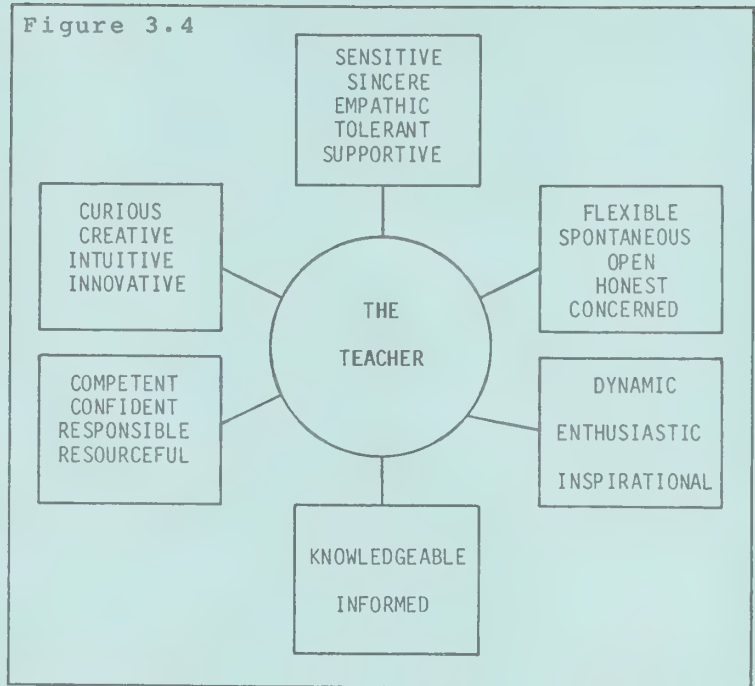
The optimum co-learning environment exists when the pupil begins to assume responsibility for learning and the teacher perceives his/her role as that of facilitator.

Qualities of the Teacher as a Co-learner

The development of feelings, attitudes, beliefs, values, and traits takes place consciously and subconsciously. Many of these affects are learned both directly and indirectly from all partners in the school community. To be an effective partner in a co-learning relationship, the teacher should attempt to model many of the qualities that are desirable for the pupils.

The potential for displaying many of the following qualities of the teacher as a facilitator should be nurtured. They should become evident in the professional performance of a teacher who has:

- a comfortable feeling of self-worth;
- a realistic respect for self;
- an honest respect for the gifted pupil as a gifted learner;
- a positive sense of humour;
- a love for living and learning.



Partnerships and the Learning Environment

A co-planning partnership can include a teacher, a pupil, or a community resource person working with an

individual pupil or small group of pupils.

During the initial stages of co-planning the teacher must ensure that the objectives and ensuing plans reflect the intent of a special education program. The pupil will eventually accept more and more responsibility for planning a program as he/she displays a comfortable and competent level of ownership of affective and cognitive skills and a commitment to independent learning. As the pupil increasingly assumes the leadership role in a partnership, the teacher assumes a facilitative, consultative, and supportive role. Within this milieu the pupil responds to and accepts increasing responsibility for learning experiences.

Opportunities should be provided for a gifted pupil to enter into interdependent partnerships with another pupil and with groups of pupils.

When it is necessary and possible, the expertise of a community resource person may be solicited in order to provide a differentiated learning experience that meets the needs of some gifted pupils. The need should be acknowledged during the first stages of co-planning, and the co-learners should accept the responsibility for identifying and contacting a community person who is knowledgeable in the area. Principal and parental approval may need to be obtained as required by school and board policy. The gifted pupil

and the community resource person would then enter into a partnership to plan, implement, and evaluate a specialized unit within the special education program. The role of the teacher within the partnership becomes one of monitoring the activities and consulting with the co-learners.

The Setting and the Learning Environment

The home, school, and community are components of a co-learning continuum that involves the gifted pupil as a responsible and resourceful learner. The interaction of the co-learners within a wide spectrum of settings will contribute to the transformation of learning from acquiescence to action and of the learner from a consumer to an independent,

creative, and productive person.

A special education program for gifted learners may be planned and implemented in one or more of the following settings:

- in a regular classroom with support from a resource teacher or consultant
- in a resource setting that may be within the school or the community
- in a special education class
- in a special school

All settings will not be available to all gifted pupils but flexibility for movement from one setting to another, and for movement to a variety of learning environments within each setting, is desirable to provide

stimulating interaction with challenging and relevant resources.

The type of learning setting will determine the amount of time that is available to the co-learners, and it may determine the degree to which learning experiences can be differentiated. The decision about the placement of a gifted pupil in a setting must be based on careful deliberation to ensure:

- that the appropriate special education program can be designed to meet the needs of the exceptional pupil;
- that maximum interaction with intellectual peers can be guaranteed.

3.3 PLANNING FOR AFFECTIVE DEVELOPMENT

Because of a gifted learner's advanced cognitive ability and advanced affective capacity, he/she acquires affects early:

- indirectly and subconsciously through incidental learning experiences that evolve from learning environments that are created by the co-learning partners in a co-learning setting
- directly and consciously through planned learning experiences

The essence of independence, as implied in the aim for planning special education programs for gifted learners, is that pupils become able to make decisions for themselves. To act wisely in decision-making

situations, the pupil must acquire cognitive skills that can be integrated with affective skills. This process requires the learner to select and analyse, through the application of cognitive skills, all of the relevant factors when deciding what the best course of action might be for all concerned. The final selection or decision is influenced by the individual's personal values system. The development of a personal values system is an integral part of affective growth. The development and subsequent application to decision-making situations should culminate in meeting self-esteem and self-actualization needs including:

- self-worth;
- self-confidence;
- strength, capability, adequacy;
- fulfilment of potential;
- attainment of aspirations.

Teachers and pupils are encouraged to examine the following references in the Ministry of Education publication Guidance 1984: Curriculum Guidelines for the Intermediate and Senior Divisions:

- | | |
|---------|--|
| Page 9 | - Aim A: To know and appreciate themselves; |
| | - Aim B: To relate effectively to others; |
| Page 18 | - Values Education in the Guideline Program; |
| Page 21 | - Appendix B. Instructional Learning Objectives and Ministry Resource Documents. |

Teachers of the Primary and Junior Divisions may wish to refer to the following pages of the Ministry of Education publication Personal and Societal Values: A Resource Guide for

the Primary and Junior Divisions
(1983) for practical suggestions for
developing values systems:

- Pages 10-11 - Helping Children to
Think About Value;
- Pages 12-13 - Making Choices;
- Pages 14-15 - A Model for Decision-
Making;
- Pages 16-17 - Curriculum Content;
- Pages 18-19 - Guidelines for the
Teacher.

The Basic Decision Model on page 135 of this publication illustrates the integration of cognitive skills with the development of affective skills. The following chart shows the compatibility of the model in this publication with the model on page 14 of Personal and Societal Values. Either of these models, a combination of both, or an alternative model will provide the pupil with a framework for decision-making that is influenced by personal and/or societal values.

<p>Basic Decision Model <u>Programming for the Gifted</u> (p. 135)</p>	<p>A Model for Decision-Making <u>Personal and Societal Values</u> (p. 14)</p>
<p>1. <u>Identification of Issue</u> The pupil identifies a difficulty or issue.</p> <p>2. <u>The Inquiry Question</u> The pupil formulates a question that clarifies the difficulty or issue around which the study will develop.</p> <p>3. <u>Alternatives</u> By applying common sense, beliefs and interests, and/or policy, the pupil generates reasonable answers to the question.</p>	<p>1. Identify the value issue and the values that are in conflict.</p> <p>2. Gather information relevant to the issue.</p> <p>3. Ask questions which, if answered, would shed light on the value issue.</p> <p>4. Gather any additional information which step 3 has shown to be important.</p> <p>5. List all the possible alternatives for resolving the problem.</p>

4. Data: Criteria and Values

The pupil utilizes information and

- a) selects the criteria (standards) for evaluating the alternatives,
- b) ranks the criteria with reference to the values they represent.

5. Synthesis

The pupil arrives at the best decision for the present by rating each alternative on criteria in light of the present situation.

6. Assessing the Conclusion

The pupil judges whether the decision or conclusion will continue to be acceptable in the future.

7. Implementing the Decision

The pupil takes action to implement the decision.

8. Evaluation

The pupil evaluates the suitability of the conclusion and the success of the action.

6. Consider the consequences of each alternative.

7. Examine the values that lie behind each alternative and identify the more important values.

8. Select the best alternative.

9. List reasons to support the choice.

10. Evaluate the decision according to the following criteria:

- Is it feasible?
- Does it resolve the value issue?
- How would you like the decision applied to yourself?
- How does the decision consider the rights of others?
- Does the decision create new problems?
- What would be the implications if the decision were universally adopted?
- Has any important information been ignored?
- Is the decision supportive of the values essential to the well-being of the individual and society?

11. Reconsider the decision.



4. COGNITIVE DEVELOPMENT

With permission from the Niagara Centre of the Ontario Institute for Studies in Education, the following growth plan for intellectual or cognitive development has been adapted from the original work of L. A. Popp, J. P. Robinson, and F. G. Robinson.¹² This growth plan is one of many, and teachers may choose to use an alternative model or combinations of several models for the development of thinking skills and their applications to inquiry or investigative procedures. Teachers are expected to modify or adapt the thinking-skills growth plan and the application to inquiry models

to meet the individual needs and abilities of the gifted learners for whom they plan special education programs. Alternatives, modifications, and adaptations should be designed to ensure that gifted pupils acquire intellectual power through the development of the breadth and depth of thinking.

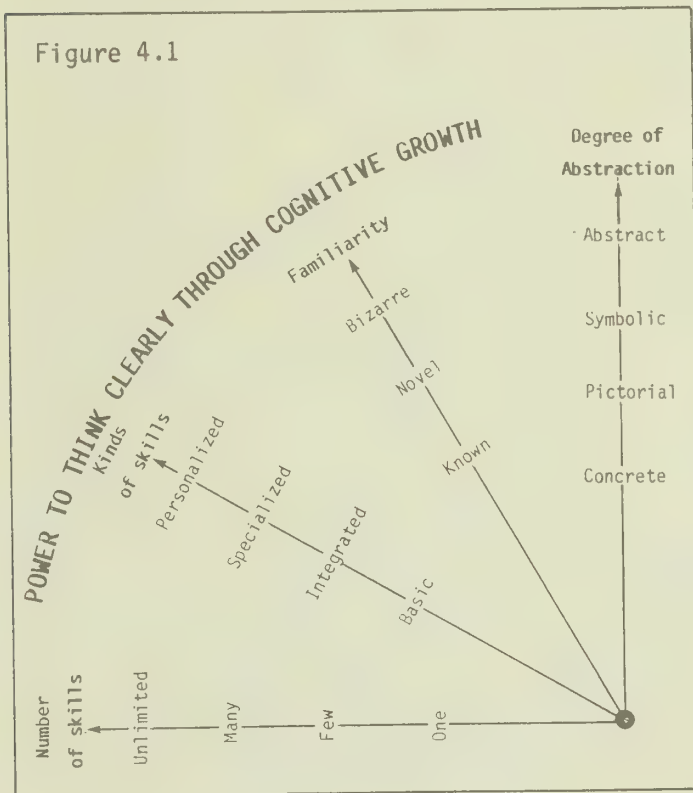
Gifted pupils have the capacity to be powerful thinkers and inquirers. Their potential for advanced cognitive growth can be nurtured through the provision of learning experiences that are planned:

- to provide for an unlimited number of thinking skills;
- to develop a vast array of thinking skills and inquiry models to help the pupils to become independent thinkers;

12. L. A. Popp, J. P. Robinson, and F. G. Robinson, Basic Thinking Skills (St. Catharines: The Ontario Institute for Studies in Education, Niagara Centre, 1974).

- to utilize thinking skills and inquiry models to discover unique and exciting solutions to real problems and issues;
- to accommodate and encourage abstract thinking.

Figure 4.1



4.1 NUMBER OF SKILLS

Gifted pupils are encouraged to acquire a multitude of affective and cognitive skills that will enable them to function as independent thinkers and learners.

Figure 4.2 provides an overview of the skills and models including:

- the development of basic thinking skills;
- the integration of thinking skills to develop more sophisticated skills;
- the application of appropriate thinking skills to the development of inquiry models;
- the modification of basic models to provide frameworks for investigating specialized topics, solving specific problems, or addressing specific issues.

As the learner accumulates, assimilates, and synthesizes thinking skills and inquiry or investigative models, he/she will develop new models. These new models are individualized to meet the changing needs of the learner and are specialized to meet new situations or problems. The modifications may be minor or major and are unlimited in scope.

4.2 KINDS OF SKILLS

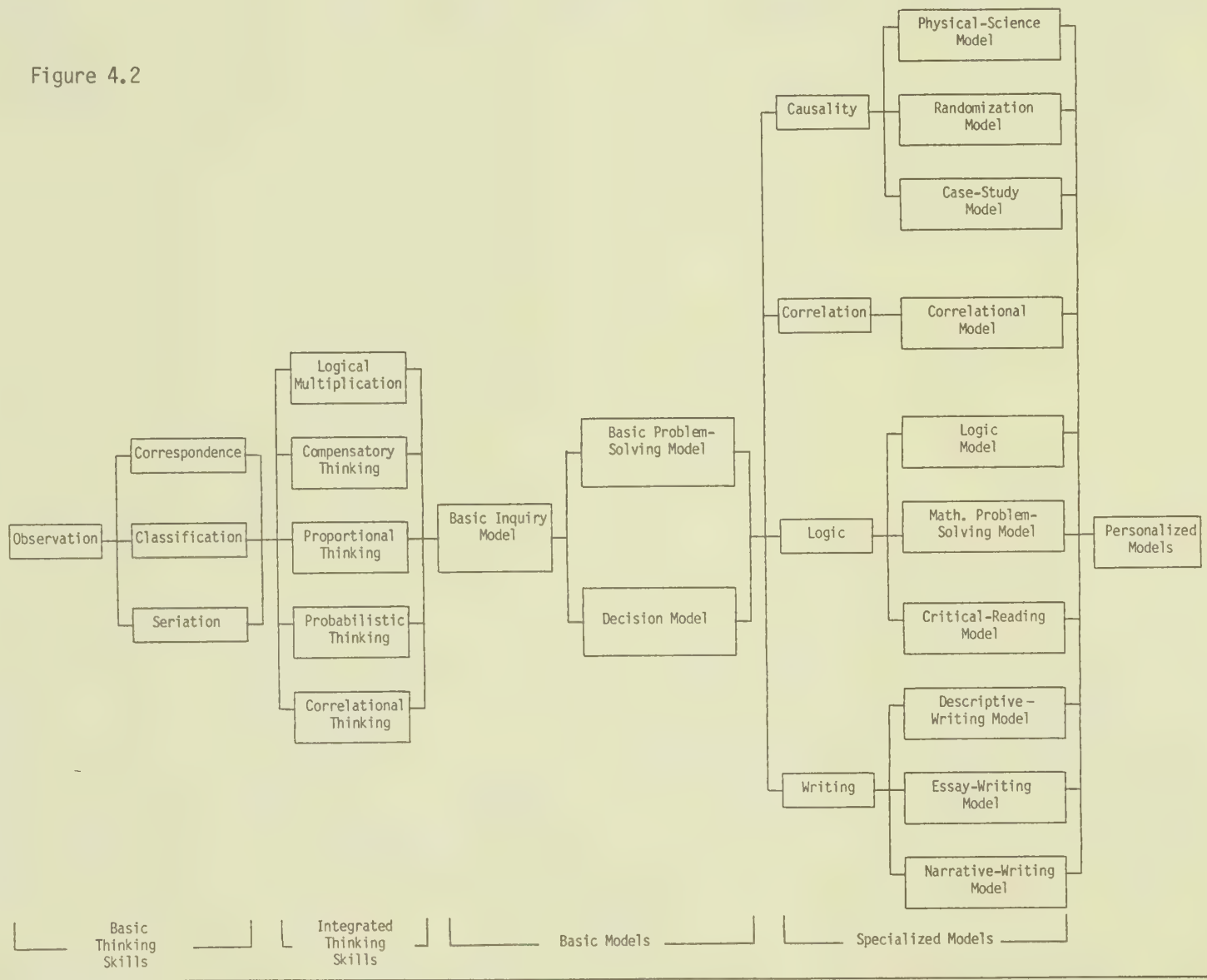
The growth plan for cognitive development includes:

- basic thinking skills;
- integrated thinking skills;
- basic models - inquiry, problem-solving, and decision;
- specialized models.

The growth strands for each thinking skill and an outline of each model are found in the appendices.

The thinking skills should be considered strategies for gathering and organizing vast quantities of facts and concepts. The models are frameworks in which the information organizers are embodied. The information organizers and the appropriate model will facilitate the formulation of conclusions and generalizations.

Figure 4.2



The following descriptions of the basic thinking skills and the integrated thinking skills are reproduced with permission, from L. A. Popp, J. P. Robinson, and F. G. Robinson, Basic Thinking Skills.

Basic Thinking Skills

The four basic thinking skills are:

- observation;
- correspondence;
- classification;
- seriation.

Observation is the ability to use all of the senses to identify the characteristics of objects and events. Although observation begins with the random activities of the newborn child, it becomes of

interest to the educator when the child begins to differentiate and to co-ordinate the various sensory approaches to the environment. The use of the senses for various purposes develops through a series of stages until, finally, the child is able to pre-plan his/her observations rather than merely to react perceptually to occurrences in the environment and to the point where he/she is able to make use of mechanical aids (e.g., hand lens, telescope, etc.) to extend the range of his/her observation capabilities (see Appendix A, page 125).

Correspondence is the matching of objects or events, or groups of objects or events. At a very simple level, children match objects one to one, as when they give one cookie to each playmate. At a more complex stage, they perform what is frequently called many-to-many correspondence when they match groups of objects by relating each set of parents to the appropriate group of children to form families (see Appendix A, page 125).

In classification, objects and events are placed into groups on the basis of similarities (e.g., grouping indoor footwear, collecting toys for the housekeeping centre, listing world records in sports, etc.). Classification is one

of the most important thinking capabilities. Because of classification, it is not necessary to deal with each instance as a discrete event; instead it is possible to react to an occurrence in terms of the class of events to which it belongs. This results in a tremendous reduction in cognitive load.

There is a considerable range of complexity to classification skills. At a simple level, the child determines whether a particular object belongs in a defined set. For example, when his/her father places a squirmy puppy in his/her arms, he/she recognizes the class to which it belongs and says "Dog". At increasingly complex levels,

the child selects elements that belong in the intersection of two overlapping classes (green apples belong to the intersection of the set of green objects and the set of apples), and eventually learns to handle hierarchical classifications (the cougar is included in the class of cats which is included in the class of mammals which is included in the class of vertebrates). Ultimately, the child understands the numerosity of relationships among hierarchical classes, the subordinate class never exceeding the superordinate class in size (see Appendix A, pages 126 and 127).

Seriation is ordering objects and events on the basis of differences in some characteristic (e.g., differences in length, weight, beauty, courage, etc.). The ability to place objects in order begins with the child indicating the correct object when two are presented and he/she is asked to indicate which exceeds the other along some dimension. Eventually, seriation becomes much more flexible and the child is able to seriate a group of objects along one variable and then reorder them along another variable. He/she has no difficulty conceiving of the objects as belonging to more than one series at the same time (see Appendix A, pages 126 and 127).

Integrated Thinking Skills

The five integrated thinking skills are:

- proportional thinking;
- compensatory thinking;
- logical multiplication;
- correlational thinking;
- probabilistic thinking.

Proportional thinking is involved in determining the magnitudes of groups in relation to each other. Simple ratio situations are common from early childhood. A child who expects cookies to be dispensed in the ratio of one to one very soon recognizes the injustice of the situation when his/her playmate ends up with more cookies than he/she has. Similarly, if George

gets one car each time Sally gets two trucks, he is soon able to determine the number of trucks one child should have when the other has three cars. Eventually, proportional thinking makes it possible for adults to deal with complex notions of velocity, per cent, interest, discount, commission, etc. (see Appendix B, pages 128 and 129).

Compensatory thinking deals with the notion of equilibrium and changes in equilibrium. When a change occurs in a system, the magnitude and direction of change must be noted, and ways in which a change can be overcome may be

selected. For example, if a weight is added to one end of a balance beam which is in equilibrium, the arm drops. This effect can be compensated for in several ways. One early response by children is, of course, to remove the weight. Other compensations are suggested by older children: adding a weight to the other side, or shifting the positions of weights on either or both sides until equilibrium is re-established.

In some instances, it is not possible to intervene in the system without permanently altering it and, therefore, the child is not able to reverse the change in the usual manner. In such cases,

the notion of experimental and control samples can be employed. One system is retained as a reference (control) group while each experimental condition illustrates one possible adjustment of the system. In other words, the samples exemplify the control condition and the effect of each of the independent variables on the system (see Appendix B, page 128).

Logical multiplication is frequently introduced as an extension of simple classification. It involves treating objects or events in terms of two dimensions at the same time. For example, grouping people into the classes male

and female is simple classification; sub-grouping each category into adults and children results in a cross-classification. This is an example of the application of logical multiplication since each element is placed according to two characteristics. So, the young girl is placed in the female-children sub-group, while grandfather is an element of the male-adult cell in the cross-classification.

Instead of discrete categories, one of the dimensions for logical multiplication might be a series representing a continuous variable (e.g., height). Similarly, logical multiplication can involve two

series rather than two discrete classifications as the two dimensions. The most common example would be the graph with continuous variables along both dimensions. The characteristics of a particular element are represented by its location on the plane of the graph, given by the co-ordinates for that point (see Appendix B, page 128).

Correlational thinking is another extension of classification and of logical multiplication. It permits people to make allowances for cases that deviate from what is regular, normal, or right. Correlation deals with relationships among variables

where not every event necessarily follows the general trend. As one variable changes in magnitude, another variable also changes, but the relationship need not be a perfect one. For example, it is incorrect to say, "Young people are bad drivers." Having met a good young driver once, one must say, "There is a relationship between age and driving ability." Correlational thinking involves identifying a relationship when it exists, indicating the direction of the relationship (positive or negative), and indicating the strength of the relationship (see Appendix B, pages 128 and 129).

Probabilistic thinking involves determining the likelihood of occurrence of an event. Very few events in the world are certain. Instead, their occurrence is more accurately described in terms of probability statements. In the usual case, probability involves determining the proportion of successful events; so the child begins by distinguishing between successful and non-successful events. Higher levels deal with establishing ratios of success and non-success, opening the door to the more traditional statistical treatment of probability (see Appendix B, page 128).

Some teachers develop with their pupils the basic and integrated thinking skills in the sequence outlined in the growth plan on pages 132 and 133, and then apply them to inquiry or investigative models as required. Other teachers prefer to introduce the basic inquiry model, the basic problem-solving model, and/or the decision model, and develop the concomitant thinking skills as required for each model. This approach provides the pupils with an immediate need to learn and to apply appropriate thinking skills. The same procedure is used with the specialized model.

Each strand for a basic thinking skill shows many levels or stages through which the skill may be elaborated, culminating in an

intensity or depth of thinking that reflects the intellectual ability of gifted learners. The application of the sophisticated levels of thinking will result in a richness of concept-building and the discovery of powerful generalizations that are unattainable by most pupils.

Basic Inquiry Model, Basic Problem-Solving Model, Basic Decision Model

The application of the basic thinking skills and the integrated thinking skills occurs during the development and utilization of inquiry, systematic investigative strategies, and communication models. The basic thinking skills and integrated thinking skills that relate to a specific model are listed with the model on pages 134 and 135.

The procedures for developing the basic inquiry model are found in the Ministry of Education publication Research Study Skills, Curriculum Ideas for Teachers, 1979. This model is summarized on page 134. The basic inquiry model can be adapted for use by pupils of all ages.

The basic problem-solving model and the basic decision model evolve from the basic inquiry model as the topics being investigated move from themes, to problems, to issues. The basic problem-solving model and the basic decision model are shown on pages 134 and 135.

Specialized Models

When the pupils have displayed competence as independent investigators,

the specialized models that are appropriate to the issue, problem, or theme can be introduced. Ten specialized models grow from the basic inquiry model, the basic problem-solving model, and the decision model. Each specialized model employs specific modifications that are characteristic of a related discipline.

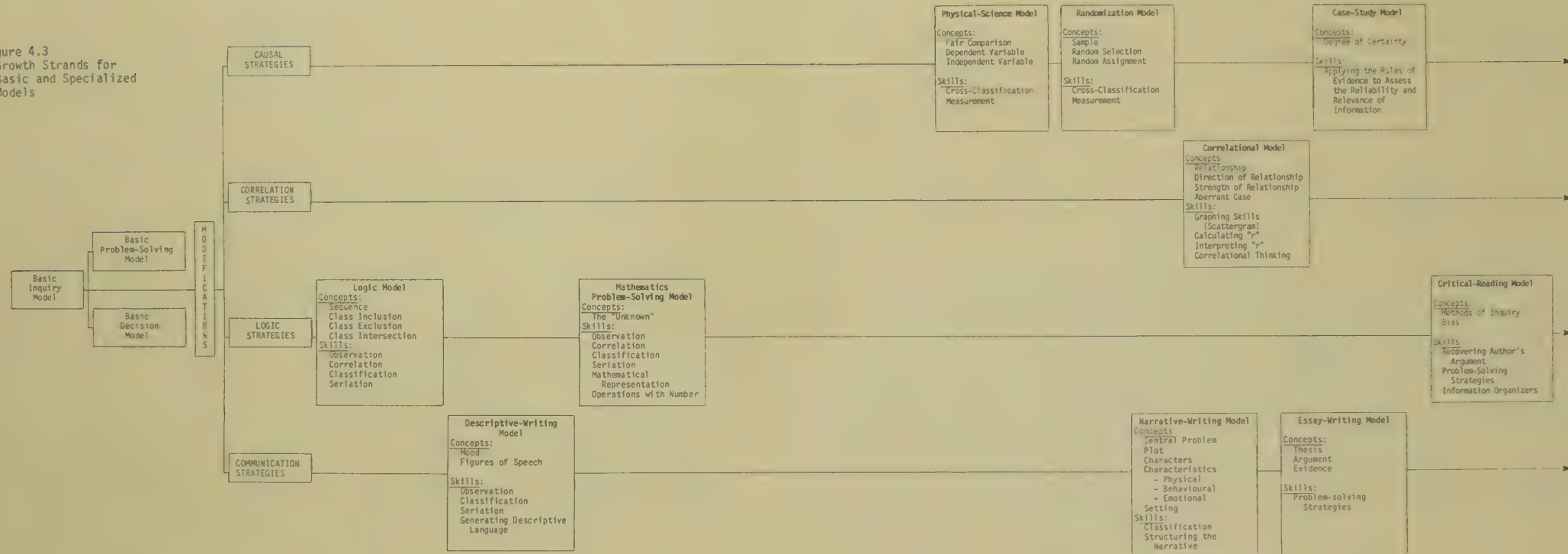
A growth strand for the introduction of the specialized models is found in Figure 4.3. The concepts and skills are indicated for each model. This growth strand is a suggestion only and should be adapted to meet the needs and interests of the pupils. Some models have prerequisites, and the sequence becomes evident as the models are analysed.



For all students the basic models provide frameworks for investigating themes, for solving problems, or for resolving issues. The specialized models, that are specific modifications of the basic models, provide gifted learners with more complex frameworks for a greater breadth of thinking.



Figure 4.3
Growth Strands for
Basic and Specialized
Models





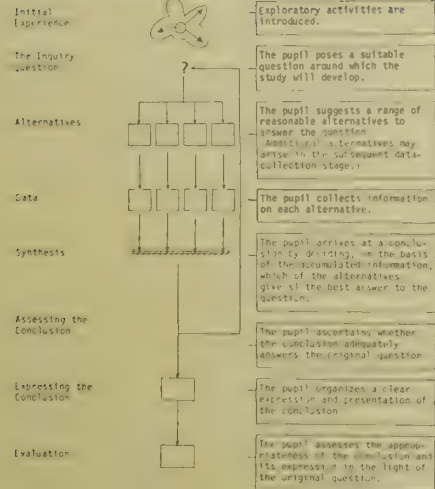
Developing New Models from Existing Models

Gifted learners will be required to make minor or major modifications to existing models to accommodate their studies in specialized areas. The following illustrates:

- the application of a cross-classification chart to both the basic inquiry model and the essay-writing model;
- minor modifications to the essay-writing model to develop a new framework for editorial writing.



THE BASIC INQUIRY MODEL



1. The basic inquiry model is selected as a framework to help the pupil structure his/her investigation and to arrive at a defensible conclusion.

2. The data is collected from a variety of sources and is organized as a cross-classification chart.

HEADING				
Sub-hdg.	Sub-hdg.	Sub-hdg.	Sub-hdg.	Sub-hdg.
Sub-hdg.				
Sub-hdg.				
Sub-hdg.				
Sub-hdg.				

3. From the organized data the pupil sees relationships and verbalizes the relationship(s) as a conclusion.

4. The essay-writing model is selected as a framework for structuring a tangible product.

5. The pupil advances his/her thesis based on the conclusion.

6. The thesis is examined by using the data from the cross-classification chart.

7. The pupil may wish to express a strong opinion about the data or about the conclusion. A new framework or model for expressing an opinion must be designed. An editorial model may be the vehicle for expressing opinion.

THE ESSAY-WRITING MODEL

Initial Experience

The Inquiry Question

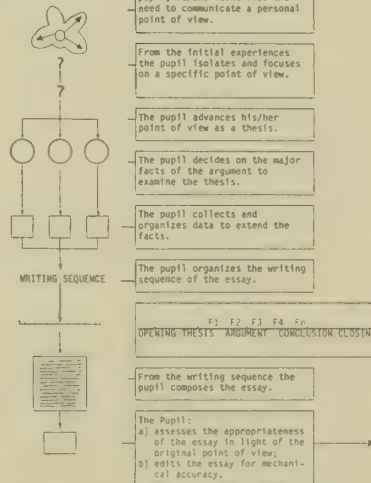
Organization

Data

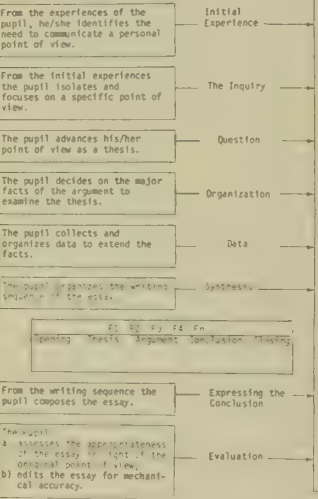
Synthesis

Expressing the Conclusion

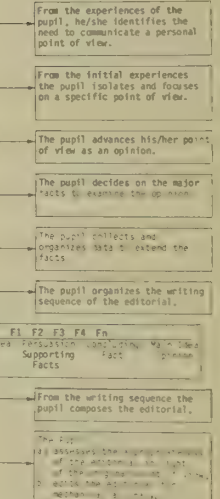
Evaluation



THE ESSAY-WRITING MODEL



THE EDITORIAL-WRITING MODEL



Personalized Models

With the integration of the breadth or complexity of thinking with the depth or intensity of thinking, gifted learners possess powerful tools for investigating themes and meeting the challenge of problems and issues. As these pupils acquire and utilize a wide range of specialized models they devise their personal modifications for their own purposes. When their cognitive growth has reached this level of maturity, gifted pupils have achieved ownership of and control over their own learning as independent thinkers.

4.3 FAMILIARITY

Gifted learners^c have the potential to be creative producers. They see unusual and diverse relationships, have the ability to generate original ideas and solutions, and have the capacity to be fluent, flexible, original, and elaborative thinkers.

One of the thirteen goals of education in Ontario is to help all pupils develop resourcefulness, adaptability, and creativity in learning and living. An important element of the aim for gifted pupils is to encourage them to function as creative and productive people in their society. This encouragement comes through the provision of appropriate learning environments and learning experiences

that are designed for the production of ideas that reflect growth from the known, to the novel, and eventually to the bizarre.

An appropriate learning environment that encourages creative production should embody:

- a physical setting that exudes creativity;
- a teacher with a desire to foster the professional attributes suggested on page 48 of this publication.

The learning experiences should be designed to provide for the development of creativity through the integration of:

- affective skills;
- cognitive skills;
- talents or aptitudes in a specific area;
- intuition.

James J. Gallagher, in his book Teaching the Gifted Child,¹³ suggests a sequence of steps through which a creative person passes in his/her production:

- preparation;
- incubation;
- illumination;
- verification.

E. Paul Torrance and R. E. Myers, in Creative Learning and Teaching,¹⁴ identify five steps for creative problem solving:

- sensing problems and challenges;
- recognizing the real problem;

- producing alternative solutions;
- evaluating ideas;
- preparing to put the idea into use.

On page 137 of this publication, the basic problem-solving model shows eight steps:

- problem setting;
- the inquiry question;
- alternatives;
- data;
- synthesis;
- assessing the conclusion;
- solving the problem;
- evaluation.

The following chart shows the relationship among the above three sequences of steps. A synthesis of these may provide the pupils with a strategy for producing original and useful solutions to real problems or issues.

13. James J. Gallagher, Teaching the Gifted Child (Boston: Allyn and Bacon Inc., 1975).

14. E. Paul Torrance and R. E. Myers, Creative Learning and Teaching (New York: Dodd, Mead & Co., 1970).

James J. Gallagher, <u>Teaching the Gifted Child</u> (Boston: Allyn and Bacon Inc., 1975), pages 249-250.	E. Paul Torrance and R. E. Myers, <u>Creative Learning and Teaching</u> (New York: Dodd, Mead and Co., 1970), pages 78-83.	Basic Problem-Solving Model - Programming for the Gifted (p. 134)
<u>1. Preparation Stage</u> - primarily a problem-identification and data-gathering stage, at which time the problem or issue is clarified.	<u>1. Sensing Problems and Challenges</u> - the learner encounters a perplexing situation, ambiguities, uncertainties, paradoxes, gaps in knowledge, etc.	<u>1. Problem Setting</u> - the pupil identifies a deficiency or a situation that becomes the problem.
<u>2. Incubation Stage</u> - during the incubation period the pupil associates new information with past information and subconsciously reorganizes the information.	<u>2. Recognizing the Real Problem</u> - the learner searches for facts to clarify the problem or puzzling situation using: <ul style="list-style-type: none"> • information from the experiences of the pupil; • textbooks and other resources; • experimentation; • collection of original data. 	<u>2. The Inquiry Question</u> - in order to deal with the problem, the pupil formulates a question that clarifies the issue.
	<u>3. Producing Alternative Solutions</u> - the learners cooperatively produce a large supply of alternative solutions through group brainstorming; - idea-spurring questions may be built around the following instructions: <ul style="list-style-type: none"> • put to other use; • adapt; • modify; • magnify; • minify; • substitute; • re-arrange; • reverse; • combine. 	<u>3. Alternatives</u> - the pupil suggests a range of reasonable alternatives to answer the question that will solve the problem.
		<u>4. Data</u> - the pupil collects information on each alternative.

Gallagher	Torrance	Basic Problem-Solving Model
<u>3. Illumination Stage</u> - at this stage the pupil suddenly sees the ideas, concept or solution to the problem or issue.	<u>4. Evaluating Ideas</u> - the learners select the best ideas by developing evaluative criteria such as: <ul style="list-style-type: none"> • cost; • time; • usefulness; • practicality; • social acceptance. 	<u>5. Synthesis</u> - the pupil arrives at a conclusion by deciding, on the basis of the accumulated information, which of the alternatives give(s) the best answer to solve the problem.
<u>4. Verification Stage</u> - the idea that was obtained through the first three stages is validated during the verification stage.		<u>6. Assessing the Conclusion</u> - the pupil ascertains whether the conclusion adequately answers the original question and solves the problem.
	<u>5. Preparing to Put the Idea Into Use</u> - the learner implements the idea; - further changes may be necessary; - implementation may require idea production.	<u>7. Solving the Problem</u> - the pupil solves the problem.
		<u>8. Evaluation</u> - the pupil expresses the appropriateness of the solution for the original deficiency.

In addition to the basic problem-solving model, creative thinking becomes an integral part of a study using the basic inquiry model or the basic decision model as the pupils suggest a wide range of alternatives to tentatively answer the inquiry question.

Many of the ten specialized models include deliberate strategies for requiring or improving creative production. Creative thinking is required in the logic model as the learners explore alternatives in their attempts to answer the inquiry question. The pupils are expected to think creatively during the implementation of the critical-reading model as they

organize their study to compare the author's procedure with an appropriate standard. The descriptive-writing and the narrative-writing models require creative thinking and creative production throughout. When gifted learners select the essay-writing model they will be expected to examine creatively a self-selected thesis. They should be encouraged to prepare and present their arguments in fresh and exciting ways that move from the novel to those that are strikingly out of the ordinary. The physical-science, randomization, and case-study models, as is true of the basic models, support creative thinking during the exploration of many alternatives

to answer the inquiry question. Gifted pupils will create diverse and unique methods for gathering data on which the conclusions will be based. For all models including the correlational model, tangible products that are unique should be designed to communicate the conclusions.

Creative producers are self-actualized people. They have available to them a repertoire of thinking skills and inquiry or investigative models from which they can design their own models. The development of personalized models will provide gifted learners with strategies to produce creatively with spontaneity, originality, sensitivity, and commitment. Teachers must encourage the pursuit of and be prepared to accept information organizers and frameworks that

are far beyond those suggested in this document.

4.4 DEGREE OF ABSTRACTION

Children appear to move through a series of stages of development in intellectual ability and exhibit different levels of performance at each stage. The growth strands for the basic and integrated thinking skills (Appendix A and Appendix B) indicate the levels of performance. Generally, children use different levels of representation as they move from the concrete, to the pictorial, to the symbolic, and finally to the abstract (see Appendix B, page 128). When planning learning experiences, teachers must be sensitive to the ability of gifted learners to think at sophisticated and

complex levels of abstraction at an early age.

The following quotation from L. A. Popp, J. P. Robinson, and F. G. Robinson, Basic Thinking Skills (pp. 17-19) will provide the co-learners with a deeper understanding of the levels of efficient representation.

One aid to the application of basic thinking skills is the ability to produce a visual representation of what the pupil intends to do. At some beginning level, the representation may be highly physical as when children employ toy cars to represent the positions of cars in a situation to which they are attending. One development which should occur is the change from physical representation to pictures, diagrams and increasingly abstract schematic representations. This progression appears to be associated with increasing competence in the

utilization of skills in problem situations. In addition, it appears to be something which is teachable and, therefore, something to which teachers should pay attention.

In addition to the use of such basic diagrammatic procedures as Venn diagrams, cross-classification tables and tree diagrams, students should develop a more general diagrammatic ability. Good problem solvers appear to employ schematic representations of complex situations which assist them in pursuing the solutions to issues. These schematic approaches are frequently idiosyncratic, therefore, teachers may wish to encourage their pupils to develop personal ways of representing problem situations diagrammatically. Nevertheless, although these diagrammatic approaches may differ from pupil to pupil, there are certain common characteristics upon which the teacher may wish to focus attention. A reflection of the pupil's ability to understand the problem setting is his/her selection of an appropriate representation for the problem. For example, when



he/she is required to calculate difference in size between the largest and the smallest elements in a series of items, the pupil should select a representation based on seriation rather than one based on ratio or probability. He/she will also select suitable categories for the representation. This is a critical aspect of cross-classification and of graphic representation.

Flexibility in the use of representations is one of the characteristics of the developmental sequence which teachers should strive to encourage. This flexibility is based on several considerations:

- (1) The pupil must realize that the systems of representation are arbitrary. They are useful to the extent that they mirror the action of various problem situations and not because they possess any intrinsic value of their own. Also, the problem situation can be correctly represented in a variety of ways.

- (2) The pupil should employ increasingly efficient representations, i.e., representations that contain less and less irrelevant information. This is one of the characteristics of the progression from the use of realistic objects, to representational objects, to pictures, and finally to abstract diagrammatic representations.
- (3) The pupil must recognize problem settings that do not present adequate data and, therefore, do not have a unique solution. In these instances, there is no one adequate representation since the problem may be represented, but the solution cannot be uniquely abstracted from it.

As flexibility of representation increases, the pupil learns to apply it to more complex settings in a more sophisticated way. It is

for this purpose that the specialized models have been designed. Each model is a framework that provides a sequence of steps that the learner can follow to solve a general or specific problem or make sound decisions about a general or specific issue. In this sense, the basic and specialized models and the personalized models may be viewed as the ultimate representations for various situations.

4.5 THE INTEGRATION OF AFFECTIVE AND COGNITIVE SKILLS

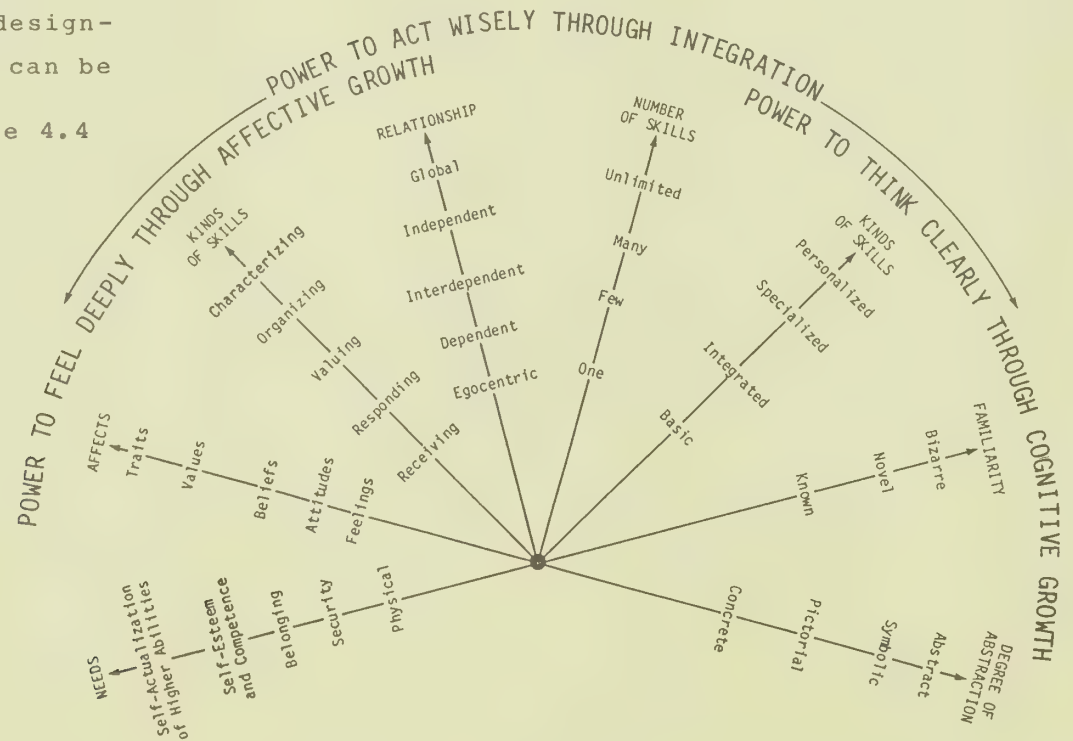
Figure 3.1, "Power to Feel Deeply Through Affective Growth", on page 37, and Figure 4.1, "Power to Think Clearly Through Cognitive Growth", on page 58, depict affective and cognitive growth as occurring along numerous rays. Learning experiences should be designed to encourage all pupils to move outwardly along each ray to develop their potential to the fullest. The degree of differentiation of the learning experiences will be determined by an assessment of the needs, abilities, interests, and aspirations of each pupil.

Experiences for gifted learners should be planned to encourage affective and cognitive growth towards the outer extremities of the rays. The degree of independence, creativity, and production is determined by quantity and the quality of the skills and the breadth and depth of the learning experiences in which all skills are integrated.

Figure 4.4, "Power to Act Wisely Through Integration", can be used as a broad base for assessing the needs of the pupils. The general ideas on the rays and the specific levels of performance that are described on the growth strands in Appendices A, B, D, and E can provide the co-learners with items for designing checklists. The checklists can be

used for developing profiles that indicate the achievements and the cognitive and affective needs of the individuals. The profile provides the teacher and the pupil with critical data to be used during the initial stage of planning.

Figure 4.4



5. PROGRAM ADAPTATIONS

5.1 PRIMARY AND JUNIOR DIVISIONS

During the initial stages the co-learning partners in the Primary and Junior Divisions may select broad-based issues, problems, or themes that form the foundations on which to build special education programs.

Inherent in a special education program for gifted pupils should be:

- a multidisciplinary approach to program adaptation;
- an interdisciplinary emphasis on learning.

This approach and emphasis should result in an integrated study that provides opportunities for:

- intrinsic and extrinsic motivation towards meeting the needs, interests, abilities, and aspirations of the learners;

- breadth and depth of content, process, product, and evaluation;
- clarification and extension of knowledge and affects through transfer;
- reinforcement and extension of cognitive and technical skills through application.

5.2 INTERMEDIATE AND SENIOR DIVISIONS

A program for a pupil in the Intermediate or Senior Division is defined as a set of one or more courses. These courses are usually developed from Ministry of Education curriculum guidelines. For exceptional pupils this program must be transformed into a special education program. To customize a program

for a gifted pupil in the Intermediate or Senior Division the co-learners must maximize flexibility in:

- designing guideline courses;
- scheduling time;
- designing non-guideline courses;
- learning beyond the classroom;
- diploma requirements.

DESIGNING GUIDELINE COURSES

Advanced-level courses that are enriched may meet the needs of some gifted learners and may be included as components of their

special education programs.¹⁵

The degree to which these courses can be adapted to meet the needs of the gifted pupil should be considered by the co-learners during the planning sessions. References to the matrix on page 31 should be made as the co-learners plan differentiated learning experiences that are "beyond those normally provided in the regular school program".

15. See Ministry of Education, Ontario, Ontario Schools: Intermediate and Senior Divisions (Toronto: Ministry of Education, Ontario, 1984), Section 4.6, p.16.

An Identification, Placement, and Review Committee of the Board may recommend that the special needs of a gifted learner in any grade of an elementary school may be met, in part, through placement in a secondary-school setting. Where local supervisory officers have granted prior permission for elementary-school pupils to enrol in secondary-school courses for credit, the principal of the secondary school may admit the pupil to one or more secondary-school courses as part of his or her special education program and shall assume the responsibility for evaluating the pupil's achievements and for granting credits. For some gifted pupils a course designed at the advanced level may provide appropriate

challenge; for others a course planned at the advanced enriched level of difficulty may be required.

SCHEDULING TIME

A credit is granted to a pupil by a principal in recognition of the successful completion of a course for which a minimum of 110 hours has been scheduled. Special provisions, however, should be made for a gifted learner whose rate of progress warrants the use of less time for the successful completion of the course than has been planned. The allocation of scheduled time is the responsibility of the principal and pacing should be considered during the planning process.¹⁶

16. See *ibid.*, Section 2.3, p.6.

Compacting is a viable process for completing the content requirements of a course in a shorter period of time. Compacting course content can accommodate those pupils:

- whose interests have led to prior mastery of some topics of the course;
- whose abilities and commitments will result in an advanced rate of acquisition and mastery of content and processes.

The scope and degree of proficiency in both previously or newly acquired knowledge and skills can be determined through:

- informal assessments during planning;
- formalized assessment and evaluation using pre-tests and post-tests.

Gifted pupils can be given time to pursue topics of personal interest in a challenging way by planning to:

- delete previously acquired knowledge and skills from the course;
- avoid unnecessary repetition;
- adjust the pace of learning.

Topics within a course or a complete course can be compacted. By compacting topics within a course of study, several periods of released time can be dispersed throughout the semester or school year. During these periods of released time gifted pupils may identify and study adjunct topics that are of

personal interest. The following chart outlines three adaptations and appropriate areas for differentiation.

	Adaptation	Differentiation
Compacting	- co-planning an adjunct topic or topics that relate to a theme of the guideline course	- differentiation of content and product with an emphasis on depth
one or more		
topics of a	- co-planning one topic or topics that are unrelated to the theme of the guideline course	- differentiation of content and product with an emphasis on kind and depth
curriculum-		
guideline		
course to	- co-planning a unit or mini-course to acquire an identified thinking skill, inquiry or specialized model, or an advanced technical skill that may be utilized in the development of a subsequent topic	- differentiation of process with an emphasis on kind, breadth, and pace
provide		
released		
time		

Some co-learners prefer to compact a complete course to

provide a longer period of released time during the latter part of a semester or school year. During this time the adjunct topic or topics can relate to, or be independent of, the course. This program adaptation can be implemented in a variety of settings and can utilize a wide range of resources.

As the co-planners assess the strengths and the needs of the gifted learners, they may identify a cognitive process or a cluster of processes that should be developed or refined. Consequently, the released time for adjunct topics or mini-courses should be scheduled to precede the compacted guideline course. The mini-course should be designed to include the development of

specialized inquiry models or advanced technical skills that have immediate application to the subsequent topics in the guideline course. The application of the newly acquired skill or skills serves two functions:

- to become the differentiation factor (breadth) of the learning experience;
- to supplement and complement the pupil's repertoire of models from which he/she can continue to build personalized models for independent learning.

The following chart summarizes two possible adaptations and the related areas for differentiation.

	Adaptation	Differentiation
Compacting	- co-planning an adjunct unit or units as a module or modules that <u>relate</u> to the compacted course	- differentiation of content, process, product, and evaluation by kind, breadth, depth, and pace
a complete curriculum-guideline course to provide released time	- co-planning a unit that is <u>unrelated</u> to the compacted course and that may become another compacted guideline course, a module of a guideline course, or a non-guideline course or module	- a greater degree of differentiation of content, process, product, and evaluation by kind, breadth, depth, and pace

DESIGNING NON-GUIDELINE COURSES

Where an academic need of a gifted pupil is identified and it cannot be met by a course developed from a Ministry of Education guideline, a non-guideline course may be developed as a component

of an exceptional pupil's special education program. Careful consideration should be given to the conditions that are specified in Ontario Schools: Intermediate and Senior Divisions¹⁷ for developing non-guideline courses. These courses can provide unlimited possibilities for differentiating learning experiences:

- to meet the needs of gifted learners;
- to challenge the abilities and nurture the potential of co-learners;
- to extend the interests of the gifted learners;
- to satisfy the aspirations of the gifted learners.

Some educators integrate learning by designing a multidisciplinary program for multicredits to allow for breadth of content, process, product, and evaluation. Multidisciplinary programs can consist of courses that are built on guidelines, or they can be designed around non-guideline courses. Most teachers find adequate flexibility within guidelines for multidisciplinary programs.

It is important, however, that choices of compulsory and elective courses enhance the aspirations of the pupils and that the inclusion of non-guideline courses not jeopardize

17. Ibid., p.32.

the learner's opportunities for admission to academic and professional courses in the future.

The following chart illustrates the advantages of non-guideline courses for gifted pupils.

	Adaptation	Differentiation
Non-guideline courses for learning experiences that go beyond those that are usually provided in the regular school program	<ul style="list-style-type: none"> - selection of content and process that can be integrated during the development of a multidisciplinary program - selection of content and process beyond the Ministry of Education curriculum guidelines - development of processes and products that are strikingly out of the ordinary - achievement of educational goals that leads to affective growth - unusual learning settings and environments - flexibility with scheduling to meet the objectives - programs and courses that are designed to accommodate learning modalities 	<ul style="list-style-type: none"> - opportunities for maximum differentiation of all components of a learning experience by all dimensions for affective and cognitive growth that encourages gifted learners to function with competence, integrity, and joy as active, independent, creative, and productive people in their societies

LEARNING BEYOND THE CLASSROOM

a) Independent Study

The needs and interests of the pupils may be met by adapting the programs to accommodate their learning styles. Pupils who are developing their personal models for learning should be encouraged to pursue topics of interest through independent study. The conditions for independent study, as outlined on page 30 of Ontario Schools: Intermediate and Senior Divisions, must be met. Teachers and pupils are encouraged to refer to pages 26 and 27 of the Ministry of Education publication Partners in Action: The Library Resource Centre in the School Curriculum for a general planning guide for structuring the study. The degree to which a pupil has

mastered independent learning skills must be assessed during the planning stage, and the acquisition of new skills and mastery of known skills must be incorporated into the plan.

The process for selecting, planning, investigating, monitoring, reporting, and evaluating the independent study topic or topics can be managed in a variety of ways depending upon the needs and abilities of the learners.

From the topics of a guideline course, that have been planned at the advanced level or the advanced enriched level, the co-learners may identify a topic

of personal interest that can be investigated through independent study. This approach may be an alternative to the in-class development of the topic or it may take place during released time that results from compacting.

Included within the plan for study will be:

- the objectives for the topic;
- identified components of the learning experience;
- a timeline that spans the time that is scheduled for completion of the study of the topic in the regular course.

Each pupil should be free to differentiate the content and

process of the learning experiences by kind, breadth, and depth. The aim for gifted learners should be evident through a creative product that can be shared with an appropriate and predetermined audience. The depth of the learning experience should result in a higher level of independence and a greater respect for self. The degree to which pacing can be differentiated will be dependent upon the extent of scheduled time. Evaluation can be differentiated through breadth, depth, and pace. The independent-study strategy provides many opportunities for the development of self-evaluation skills.

The practice of isolating topics from a guideline course or from an approved non-guideline course for independent study may be extended to include several related topics that can be developed as a unit. This practice may be extended further to include a complete course. The independent study of a major component of a course or a complete course will provide opportunities for gifted pupils to be creative when planning for differentiation in all aspects of the learning experiences. This freedom to plan, to implement, and to evaluate courses will encourage the pupils:

- to accept responsibility for their learning;

- to assume ownership of their learning;
- to gain power over their learning.

The following chart provides an overview for independent study.

Chart Pg. 95 here

	Adaptation	Differentiation
Independent study for independent thinking and learning	- co-planning a topic or unit of a guideline or non-guideline course to be implemented using an independent study mode	- differentiation of process, product, and evaluation by breadth and depth
	- independently planning a topic or unit of a guideline or non-guideline course to be implemented using an independent study mode	- differentiation of process, product, and evaluation by kind, breadth and depth with an emphasis on pace
	- co-planning or independently planning a complete guideline or non-guideline course to be implemented using an independent study mode	- differentiation of content, product, and evaluation by kind, breadth, depth and pace

gifted learners can be met through the utilization of resources that are available in the community. This expertise of human resources within the community may be required to enhance the pupil's learning and to assist him/her to reach his/her potential. The perceptive teacher will be sensitive to the time when the specialized knowledge and skills of community resource personnel may be required to provide learning experiences that will take the pupil beyond the regular program.

b) Co-operative Education

All pupils, including the gifted, should be able to participate in co-operative-education courses. Some needs and aspirations of

All co-operative-education courses have in-school and out-of-school components. These courses, for gifted pupils, must meet the requirements as

stipulated in Ontario Schools:
Intermediate and Senior Divisions
(pp. 25-27).

adverse effect on decisions
regarding university admission
and university admission scholar-
ships.

DIPLOMA REQUIREMENTS

To provide for a greater degree of flexibility in managing and adapting programs for some gifted learners, the principal of the secondary school may reduce the sixteen compulsory credits by a maximum of four.¹⁸ Consequently, the exceptional pupil's program could include a minimum of twelve compulsory credits within the thirty credits required for diploma purposes. This option should be exercised with a great deal of caution if it is anticipated that it will have an

18. See *ibid.*, Section 4.10, p. 18.



6. THE PLAN

In The Formative Years, the policy for curriculum planning indicates that "the Ministry articulates the broad goals" and "school staffs, both as individual teachers and as a collective body under the leadership of the principal, have the task of planning classroom programs specifically adapted to children for whom they are responsible."¹⁹ This policy is reiterated in Ontario Schools: Intermediate and Senior Divisions and, for exceptional pupils, is delineated further in the Education Act. A pupil who is identified as gifted by an Identification,

Placement, and Review Committee is entitled to a special education program "that is based on and modified by the results of continuous assessment and evaluation."²⁰

A program for a gifted pupil must:

- relate to his/her identified affective and cognitive needs;
- provide learning experiences that are differentiated to accommodate his/her
 - proven abilities,
 - perceived interests,
 - expressed aspirations.

A special education program for an identified gifted

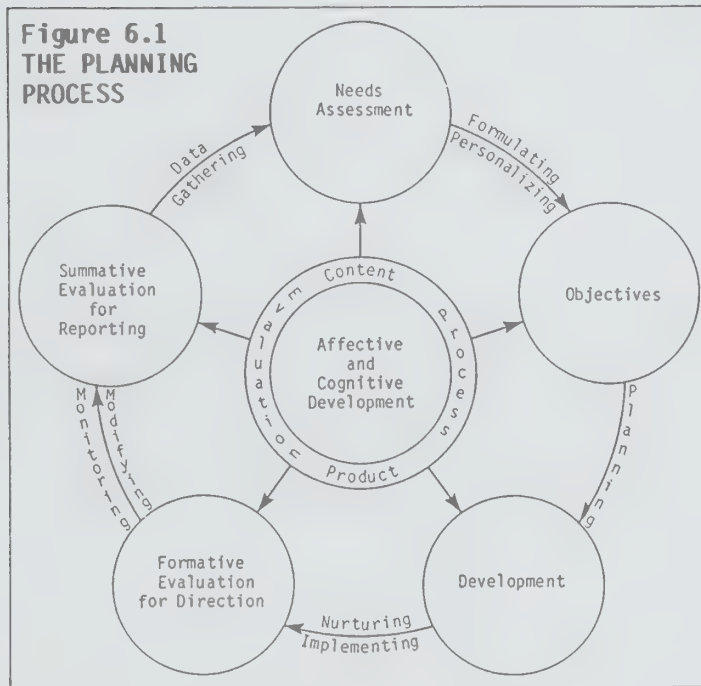
19. Ministry of Education, Ontario, The Formative Years (Toronto: Ministry of Education, Ontario, 1975), p.2.

20. Paragraph 63, Subsection 1.(1), Education Act.

pupil must include a plan that contains:

- specific objectives;
- an outline of educational services that meets the needs of the learner.

The planning process for gifted learners follows the same steps as those for any learner. Figure 6.1 illustrates this process.



With gifted learners the initial planning sessions will involve both the teacher and the pupils as active participants in the co-planning process. During the preliminary stages of co-planning, the following should be considered:

- the goals of education for all pupils (see pages 8 and 9);
- the aim for gifted learners (see page 23);
- the general characteristics and the concomitant needs of gifted pupils (see pages 11, 19 to 22);
- the partners for learning (see pages 48 and 49);
- the learning setting (see pages 50 and 51);
- program management and adaptations (see pages 91 to 103).

During this stage of co-planning the teacher and the pupils may wish to extend or modify the descriptions of the general characteristics and concomitant needs in order to design checklists. The data gathered from the checklists can be the bases for making decisions regarding:

- the selection of appropriate goals for gifted pupils;
- the identification of the partners for the learning experience;
- the location of the learning setting or settings;
- the negotiations for program adaptations.

When these decisions have been made, the co-learners can proceed with the development of the plan for the learning experiences.

6.1 THE STRUCTURE OF THE PLAN

The charts on pages 114 to 121 consist of four parts, one part for each of the components of a learning experience:

- content;
- process;
- product;
- evaluation.

Each part consists of two sections:

- a guide for content, process, product or evaluation;
- a plan for content, process, product or evaluation.

Each "guide" section is structured to encourage the co-learners to examine one of the components of the learning experience and to consider strategies for differentiating that component through four dimensions:

- kind
- breadth

- depth
- pace

The format of each "guide"

requires the co-learners to consider the answers to a series of questions under five headings:

- analysis
- needs assessment
- formulation of objectives
- development
- evaluation

Opposite each "guide" is a "plan" on which the co-learners can record the answers to the questions. It is suggested that each blank page of the "plans" be duplicated for subsequent planning sessions.

6.2 DEVELOPING A PLAN

During the development of a plan information may be made readily

available by duplicating the following charts and using them as study cards:

- differentiation matrix (page 31)
- the content chart (page 32)
- the process chart (page 33)
- the product chart (page 34)
- the evaluation chart (page 35)

The following sequence of suggestions may help the co-learners use the guides to develop plans for the four components of learning experiences:

- a) identify the affective and cognitive needs of the pupils;
- b) select the component or components of the learning

experiences that should be developed to meet the affective and cognitive needs identified above;

- c) select a topic for study.

The co-learners may wish to develop:

- a plan for a complete unit of study that evolves from a broad-based issue, problem, or theme;

or

- a plan for the study of a specific topic;

- d) identify the dimensions that should be differentiated for each of the components. It is not anticipated that all dimensions for all components of a learning experience will be emphasized in each experience;

- e) refer to the guides for content, process, product, and evaluation.

ANALYSIS

The analysis steps of the planning process will provide an overview of the content, process, product, and evaluation. This overview can be developed through brainstorming and will become the basis for the answers to the questions in the analysis column. The answers can be recorded in the appropriate cell of this column on the plan.

It may be necessary for the teacher or the dominant partner to probe for further information or to supplement the information to ensure that the breadth, depth, and pace have been considered.

NEEDS ASSESSMENT

The needs-assessment step of the guide and the plan requires the co-learners to classify their responses to the brainstorming process. The number of classes and the criteria for classifying are implicit in the questions in the needs-assessment columns of the guides. Two basic questions identify the classes:

- What do the learners already know?
- What must be learned?

FORMULATION OF OBJECTIVES

When the needs for content and process acquisition and product and evaluation development have been identified, then the

objectives, in terms of learning outcomes, can be formulated by the co-learners.

Some co-learners will record answers to the questions in the analysis, needs-assessment, and formulation-of-objectives columns for each of the four components and then synthesize these into a primary objective before proceeding with the next stage. Other co-learners may prefer to complete each page of the plan in sequence and then synthesize all information on the plan to develop a general plan for the unit of study.

DEVELOPMENT

Answers to the questions in the development column of the guide will provide the co-learners with suggestions for teaching/learning activities through which the objectives can be met. The tentative decisions to the following can be finalized and recorded on the plan:

- school and community resources, including members of the partnership;
- the settings;
- program adaptations, including scheduled time.

EVALUATION

The members of the co-learning partnerships are encouraged to reflect on the program and their performance in order to add depth to the learning experiences.

Alternative evaluators, beyond the co-learners, will add breadth. By integrating the model on page 106 with answers to the questions in the plan, the co-learners can design and implement appropriate assessment and evaluation strategies that will encourage them to strive for excellence.

Information derived from continuous assessment and evaluation can serve two purposes:

- as formative evaluation to facilitate modifications to the pupil's special education program;
- as summative evaluation that takes place at the conclusion of a unit of study or a period of time and forms the basis for reporting.

Modifications to the pupil's program result from newly identified needs that are revealed through the teacher's observation of the performance of the pupil and through formal and informal assessment techniques. Assessment strategies for gifted learners will not differ greatly from those that are used by teachers for all pupils. The evaluation of the progress of a gifted pupil must reflect his/her achievement in relation to the objectives that have been stated. Teachers, however, should be aware of the statement

from Ontario Schools: Intermediate and Senior Divisions, 1984:

Advanced-level courses that are enriched may be offered where feasible. Student achievement in such courses shall be reported at the advanced level so that all students taking an advanced-level course, whether it is enriched or not, will receive assessments based on comparable standards. This is particularly important when students submit their results to post-secondary institutions.²¹

f) As a gifted learner gains facility with planning procedures, the teacher's

21. Ontario Schools: Intermediate and Senior Divisions, p. 17.

role will become that of facilitator, monitor, and evaluator. As an independent learner, the pupil will be encouraged to use the guide in developing a plan. This plan could become a contract for learning.

A GUIDE FOR PLANNING CONTENT						
Content Analysis			Content Assessment	Formulation of Objectives	Development	Evaluation
Which of the four dimensions for differentiating content will be emphasized during this study?	KIND	What broad-based issue, problem, or theme is to be considered for study? What content is relevant to the broad-based issue, problem, or theme?	Of the relevant content, what has been mastered?	As a result of the assessment, what outcomes should be expected at the conclusion of the learning experience?	What teaching/learning strategies and activities should be considered by the co-learners to achieve the objectives? How can the learning experiences be adapted to accommodate: a) learning styles; b) settings; c) resources; d) schedule?	How well has each objective for content acquisition been achieved? a) What evaluation techniques are to be used? b) What criteria are to be established? c) By whom will the criteria be established and applied?
	BREADTH	What subjects of the curriculum will evolve from the broad-based issue, problem, or theme to make the content a multidisciplinary approach to learning?	Of the relevant content, what should be acquired?			
	DEPTH	To what topic or topics of the content does the learner show an intense interest and a strong commitment?				
	PACE	What is the expected timeline for the development of the content? What content can be compacted and still retain the integrity of the topic? What content will require extended periods of time due to intense interest?				

A PLAN FOR CONTENT						
Analysis			Assessment	Objectives	Development	Evaluation
Which dimension(s) for differentiating the content will be emphasized in this study?	KIND					
	BREADTH					
	DEPTH					
	PACE					

A GUIDE FOR PLANNING PROCESS						
Process Analysis			Process Assessment	Formulation of Objectives	Development	Evaluation
Which of the four dimensions for differentiating process will be emphasized during this study?	KIND	What thinking skills, basic and specialized models, advanced technical skills, and affective skills are required for the development of the content of the broad-based issue, problem, or theme?	Of the essential models and skills, which ones can be readily applied?	As a result of the assessment of the needs of the learner, the content to be developed, and the skills to be acquired, what learning outcomes should be expected?	What teaching/learning strategies, activities, and resources should be considered by the co-learners to acquire, master, and/or practise the cognitive and affective processes and advanced technical skills?	How well has each cognitive skill, affective skill, and each advanced technical skill been acquired, mastered and/or applied?
	BREADTH	What cognitive processes and advanced technical skills will contribute to complex thinking and the transference of skills among the disciplines of the study?				
	DEPTH	What levels of the cognitive processes and advanced technical skills will encourage intense thinking?	Of the essential models and skills, which ones should be developed for application during the study of the topic?			
	PACE	What degree of independence is evident through accurate application of basic and specialized models to a personalized model?				

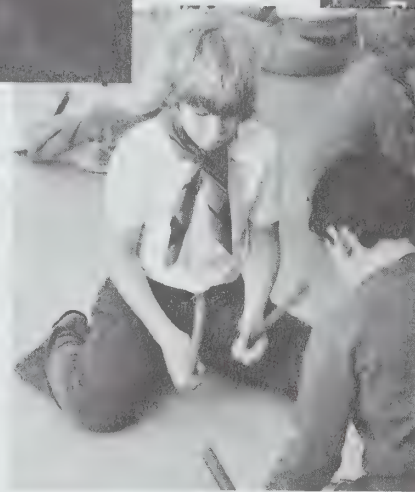
A PLAN FOR PROCESS						
Analysis			Assessment	Objectives	Development	Evaluation
Which dimension(s) for differentiating the process will be emphasized in this study?	KIND					
	BREADTH					
	DEPTH					
	PACE					

A GUIDE FOR PLANNING PRODUCT						
Product Analysis			Product Assessment	Formulation of Objectives	Development	Evaluation
Which of the four dimensions for differentiating product will be emphasized during this study?	KIND	<p>What are the possible tangible products that can be developed during this study?</p> <p>What are the affective or intangible products that can be developed during this study?</p>	<p>1.a) Of the possible tangible products, which ones have been produced previously?</p> <p>b) Of the possible intangible products, which ones are evident?</p> <p>2. Of the possible tangible and intangible products, which ones are appropriate to the topic, to the learners, and/or to the audience?</p>	As a result of the assessment of the needs of the learner, the content to be developed, the skills to be acquired, and the selection of the appropriate products and audiences, what learning outcomes should be expected?	What teaching/learning strategies and resources will be required to assist the learners to meet the objectives?	<p>How well were the objectives for the development of tangible products achieved?</p> <p>How well were these products received?</p> <p>How well were the objectives for the acquisition of intangible products achieved?</p>
	BREADTH	What tangible products can be developed that are based on speculation, that are creative in style, content, and structure, that require interdisciplinary participation, and that contribute to the society of the learner?				
	DEPTH	What changes in behaviour can be the intangible product of the learning experience?				
	PACE	How will the mode of presentation take into account the nature of the product and the audience's knowledge of the topic?				

A PLAN FOR PRODUCT						
Analysis			Assessment	Objectives	Development	Evaluation
Which dimension(s) for differentiating the product will be emphasized in this study?	KIND					
	BREADTH					
	DEPTH					
	PACE					

A GUIDE FOR PLANNING EVALUATION						
Evaluation Analysis			Evaluation Assessment	Formulation of Objectives	Development	Evaluation
Which of the four dimensions for differentiating evaluation will be emphasized during this study?	KIND	What measurement procedures are appropriate for evaluating the program and the performance of the learners as they acquire and apply the content and the skills to the development of the products?	Of the evaluation procedures, which ones have been used successfully?	As a result of the assessment of the needs of the learner, the content, the cognitive processes and skills to be acquired for the development of an appropriate product, what learning outcomes should be expected?	What teaching/learning strategies and resources will be necessary to assist the learners to meet the objectives?	How well has each objective for the development of evaluation procedures been achieved?
	BREADTH	1. What alternative evaluators are available to co-evaluate the program and the performance? 2. What are the appropriate evaluation procedures for alternative evaluators?	Which evaluation procedures should be developed?			
	DEPTH	What procedures should be developed and applied to encourage gifted learners to evaluate their programs and performances as independent learners?				
	PACE	How can formative and summative evaluation encourage gifted learners to strive for excellence as independent, creative, and productive people within their societies?				

A PLAN FOR EVALUATION						
Analysis			Assessment	Objectives	Development	Evaluation
Which of the four dimensions for differentiating evaluation will be emphasized during this study?	KIND					
	BREADTH					
	DEPTH					
	PACE					

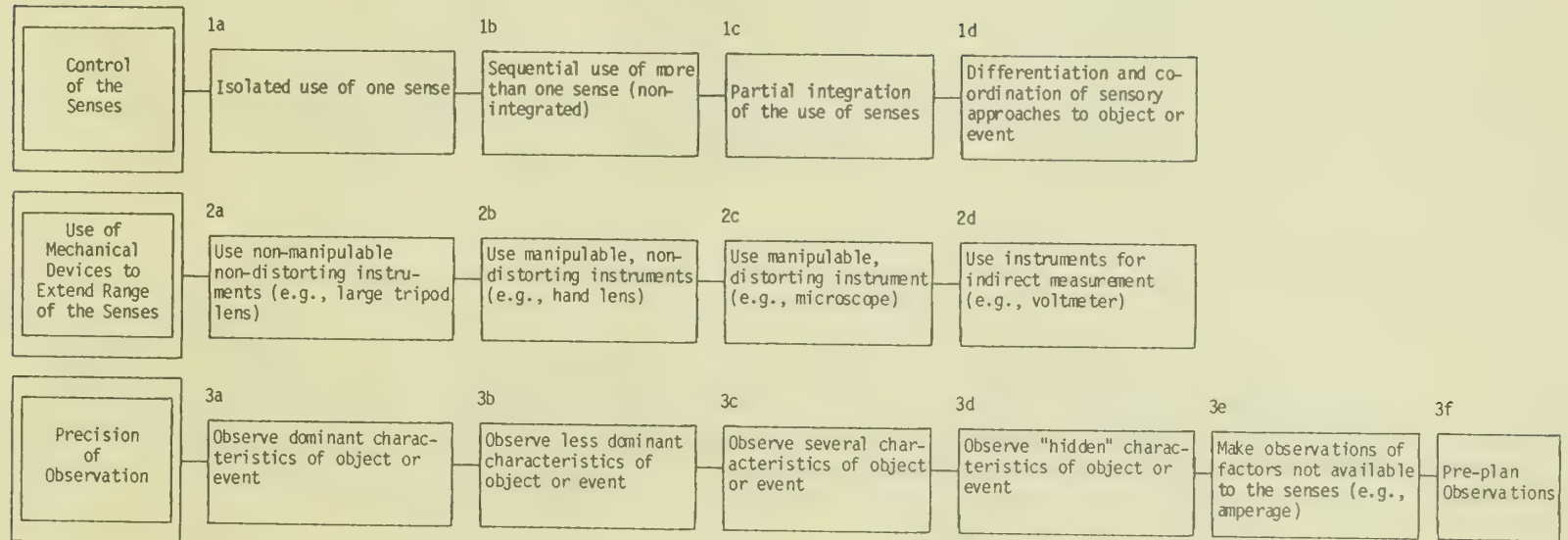


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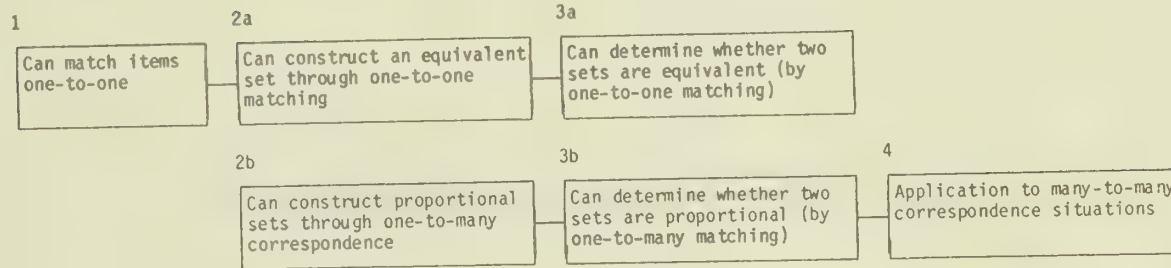
APPENDIX A Basic Thinking Skills

Observation Observation is the ability to use all of the senses to identify the characteristics of objects or events.



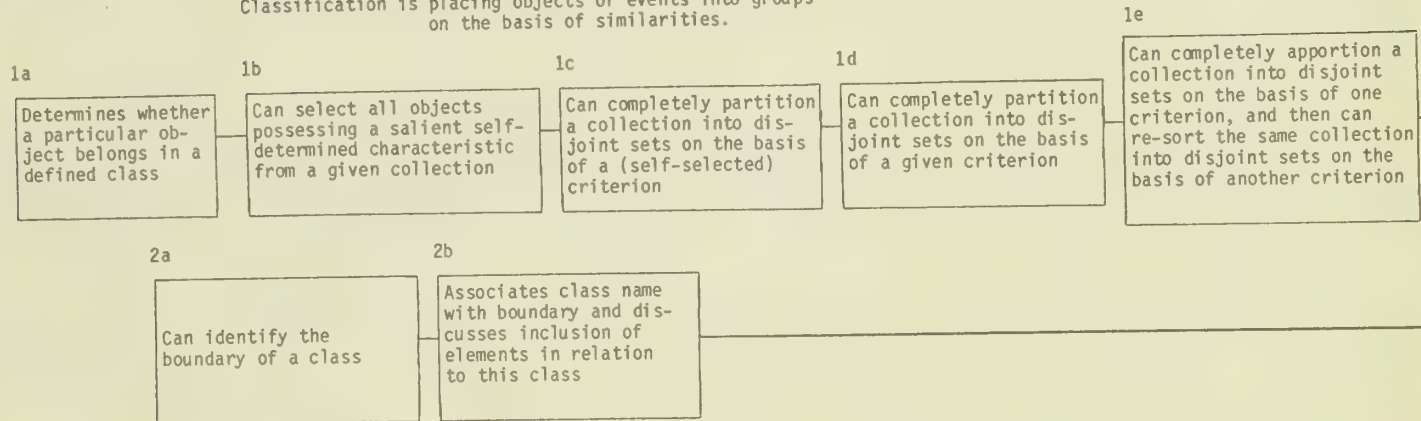
Correspondence

Correspondence is the matching of objects or events or groups of objects or events.



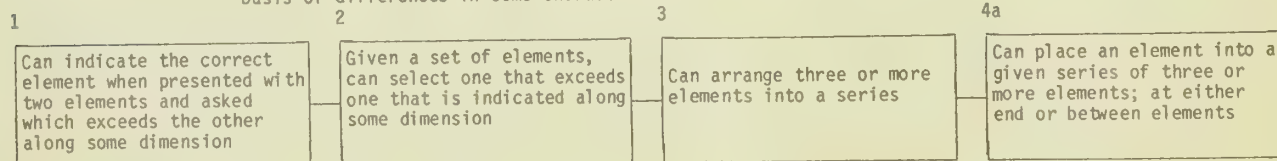
Classification

Classification is placing objects or events into groups on the basis of similarities.



Seriation

Seriation is ordering of objects and events on the basis of differences in some characteristic.



3a

Can divide a given collection into two or more classes and recognize that some elements from each class form another class; can locate the boundary of the new class

3b

Can describe the multiple membership of any designated element

3c

Can select an element that fits in the intersection of two overlapping classes

5a

Can construct an appropriate representation (Venn diagram, cross-classification table, or tree diagram) given verbal description of the data

6

Recognizes that a number of language variants can be linked to each of the three standard efficient representations

2c

Identifies by name an element which belongs in the intersection of two classes designated by name only

5b

Can interpret an appropriate representation (Venn diagram, cross-classification table, or tree diagram)

4b

Given a group of objects, can seriate them along one dimension, then reseriate them along another dimension

5

Can construct a diagrammatic representation of a serial relationship

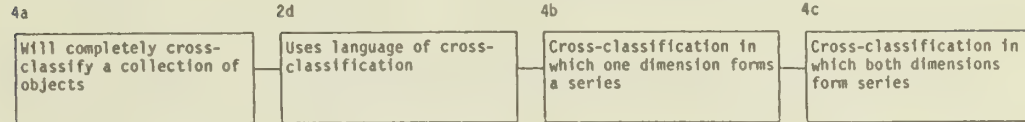
6

Can construct a diagrammatic representation to represent verbal propositions of the form $A > B$; $B > C$; $A > C$

APPENDIX B Integrated Thinking Skills

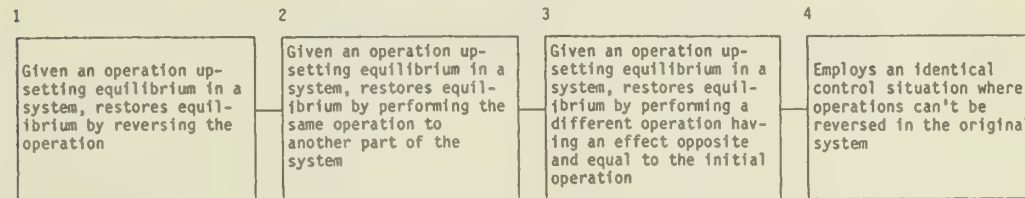
Logical Multiplication

Logical Multiplication involves treating objects or events in terms of two dimensions at the same time.



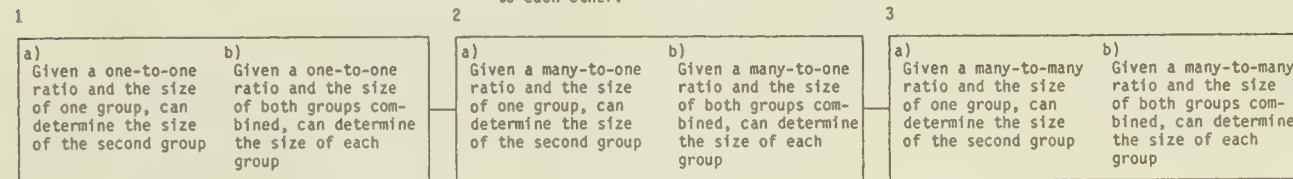
Compensatory Thinking

Compensatory Thinking deals with the notion of equilibrium and changes in equilibrium.



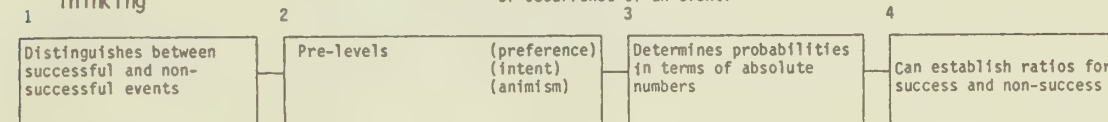
Proportional Thinking

Proportional Thinking is involved in determining the magnitudes of groups in relation to each other.



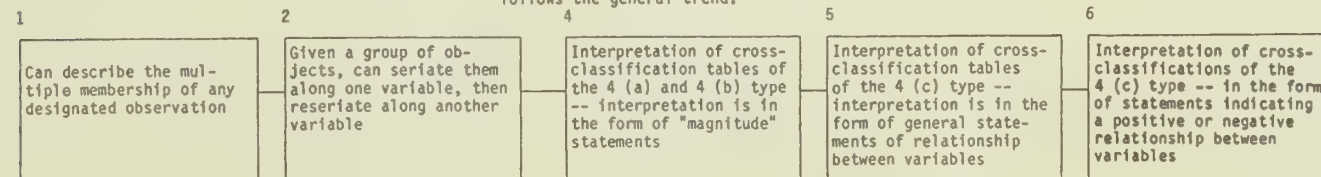
Probabilistic Thinking

Probabilistic Thinking involves determining the likelihood of occurrence of an event.



Correlational Thinking

Correlational Thinking deals with relationships among variables where not every event necessarily follows the general trend.



4

Recognizes situations in which proportionality can be employed, e.g., kilometres per hour, 3 cans for 19¢, etc.

5

Can deal with uneven cases

6

Can deal with "complex" situations involving proportionality, e.g., percent, interest, etc.

7

Employs a suitable diagrammatic representation to show a relationship between variables

8

Mathematical sophistication in the interpretation of the relationship between two variables

Flexibility of Interpretation

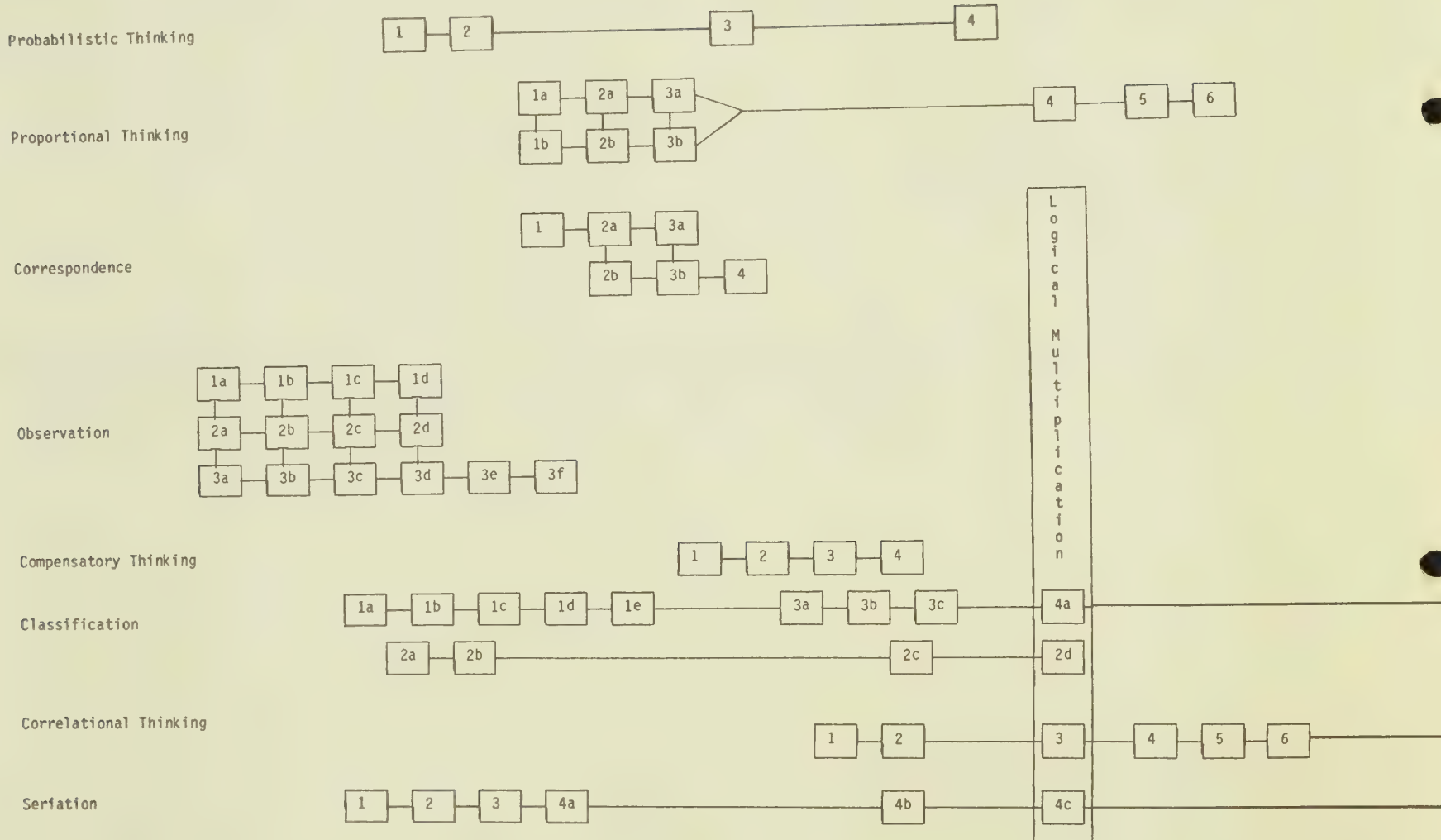
Abstraction to the point of Efficient Representation

- (a) Selects the representation most appropriate to a problem
- (b) Selects "convenient" categories with which to employ efficient representations

1	2	3	4
Recognizes the arbitrariness of systems of representations	Can determine that a description of a relationship is inefficient in the sense that it contains unnecessary information	Determines that data provided do not allow unique representations of relationships	Employs information-processing strategies systematically to deal with increasingly complex data

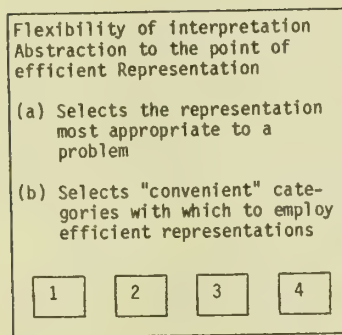
APPENDIX C

Chart of the Thinking Skills



This chart is a reconstruction of all of the growth strands for the basic and integrated thinking skills. The chart is designed to show the relationships across the strands. Some teachers have constructed a large wall chart by reproducing the growth strands, cutting out each box, referring to this chart as a guide, and pasting each box in its respective place. The large wall chart can be transcribed into a checklist.

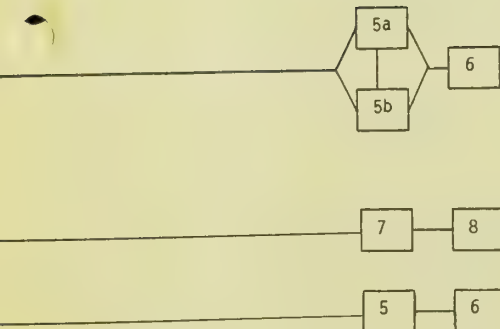
Teachers should refer to page 31 for alternative ways for developing these skills.



BASIC INQUIRY
MODEL

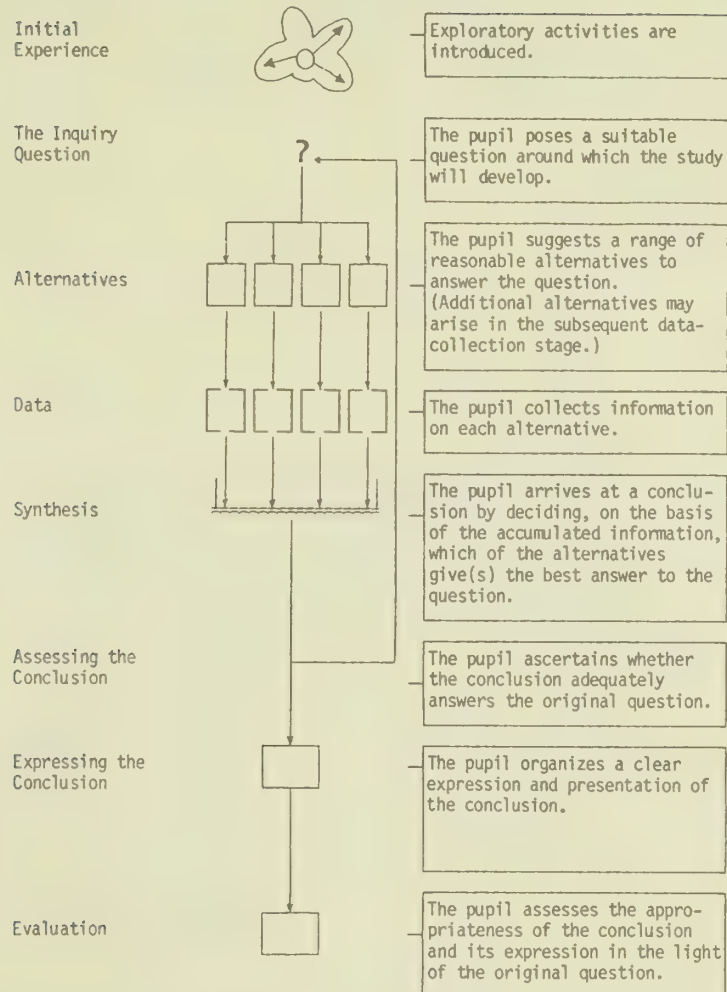
AND

MODIFICATIONS



APPENDIX D BASIC MODELS

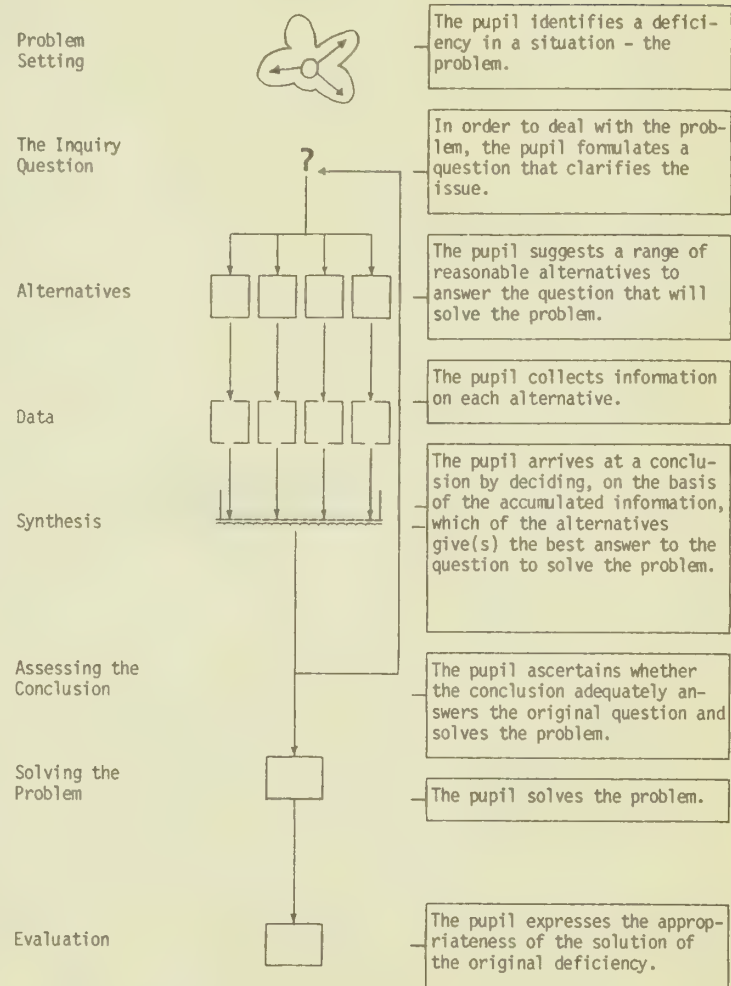
THE BASIC INQUIRY MODEL



For THEMES

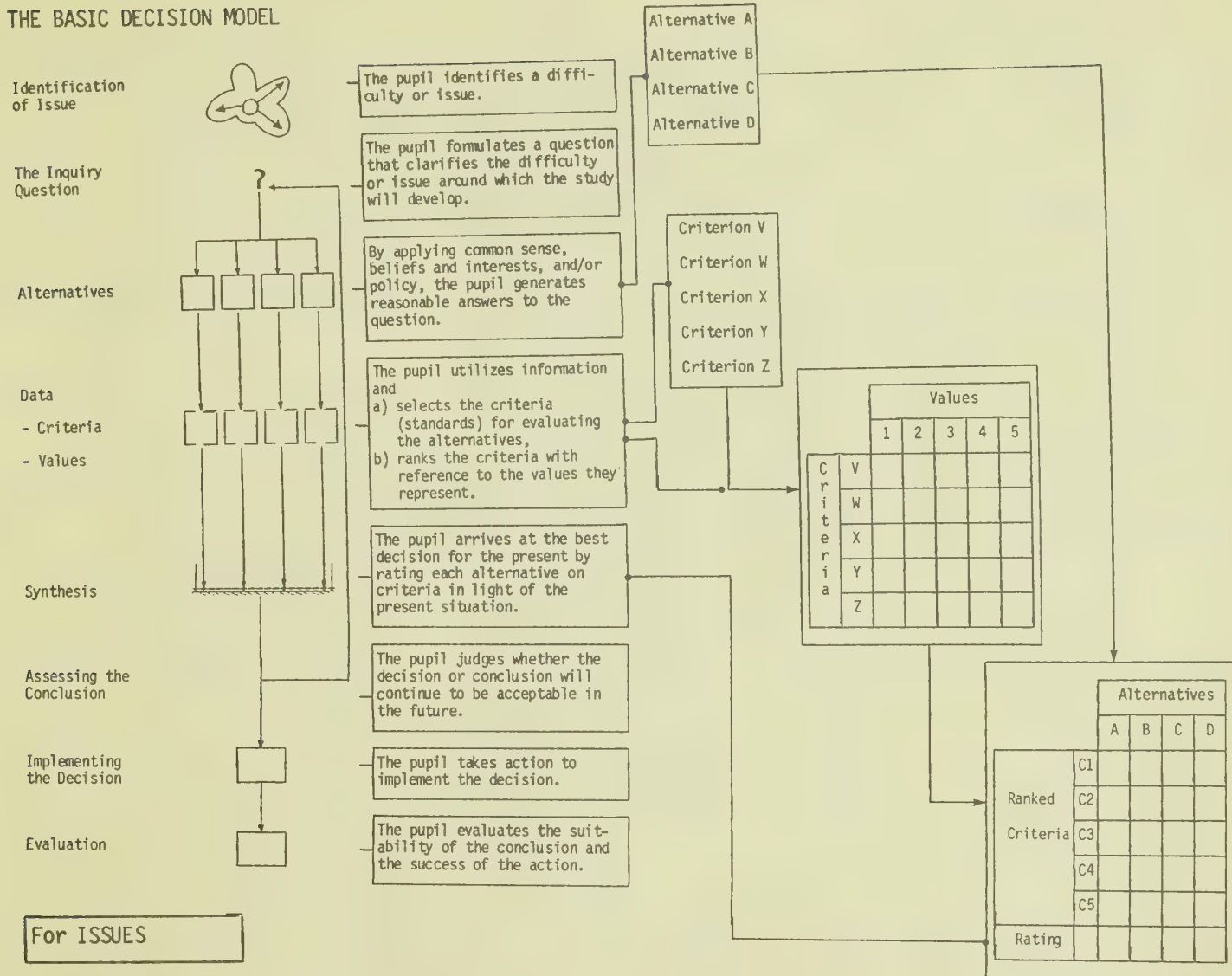
From Ministry of Education, Ontario, Research Study Skills.
Curriculum Ideas for Teachers (Toronto: Ministry of
Education, Ontario, 1979), p. 20.

THE BASIC PROBLEM-SOLVING MODEL

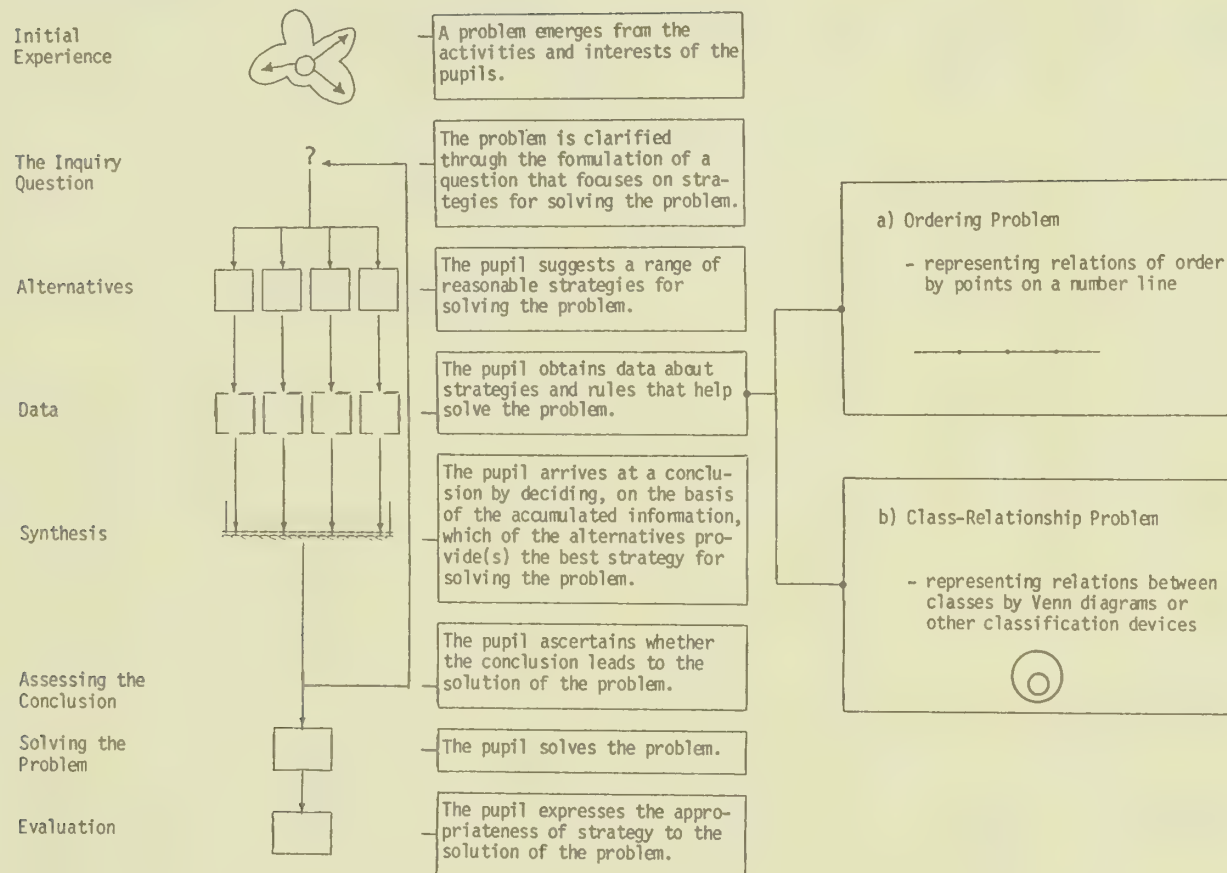


For PROBLEMS

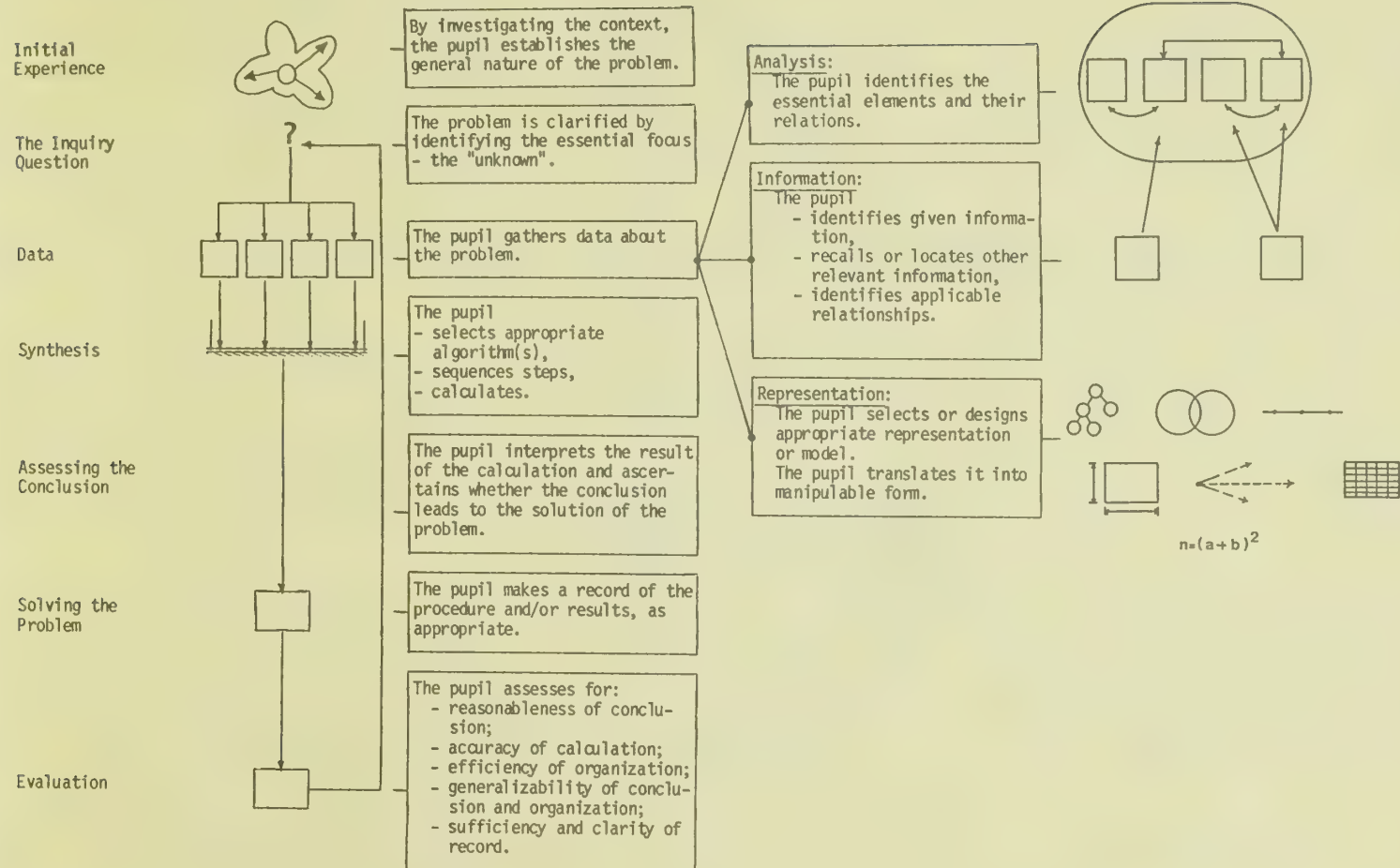
THE BASIC DECISION MODEL



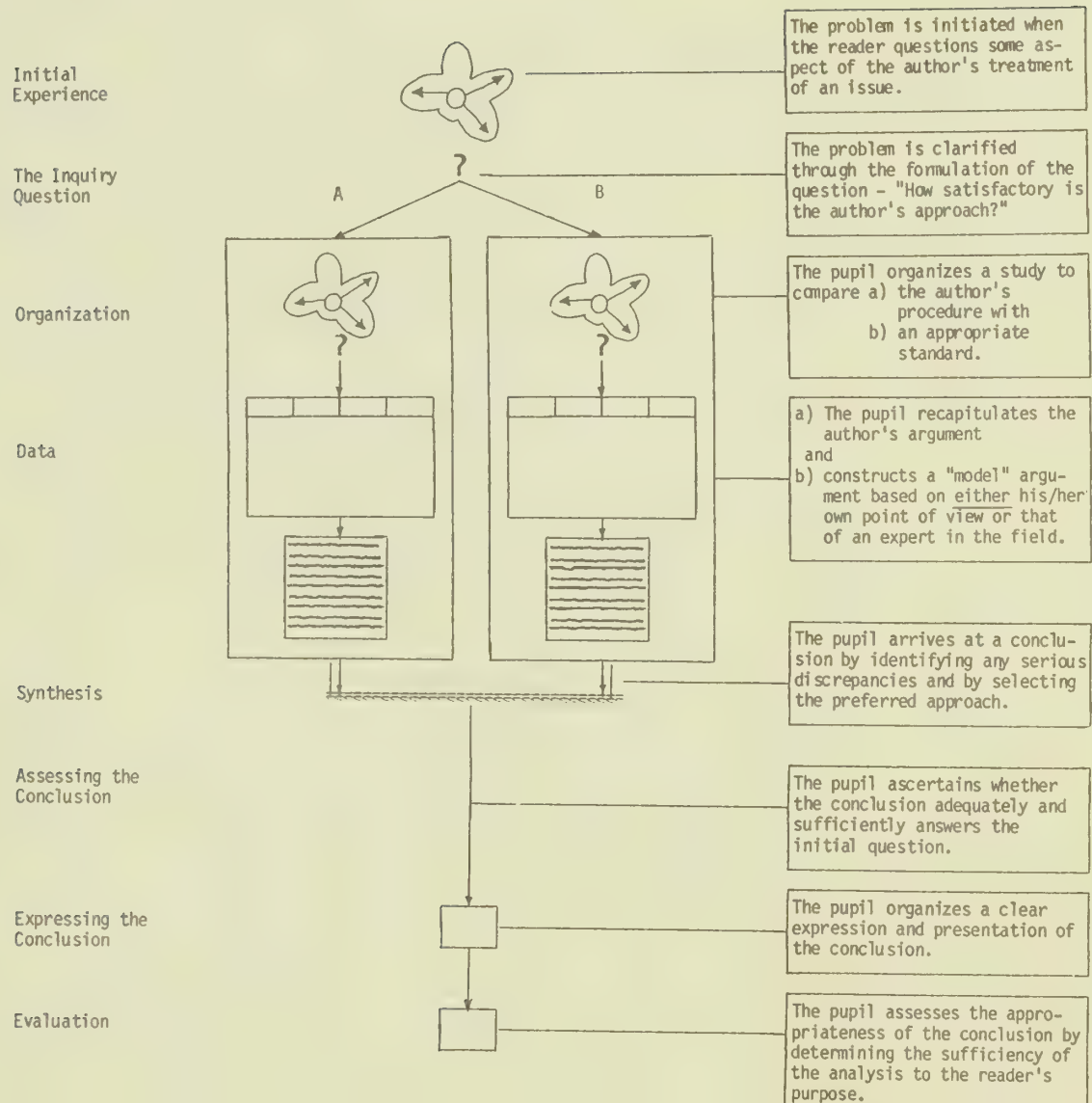
THE LOGIC MODEL



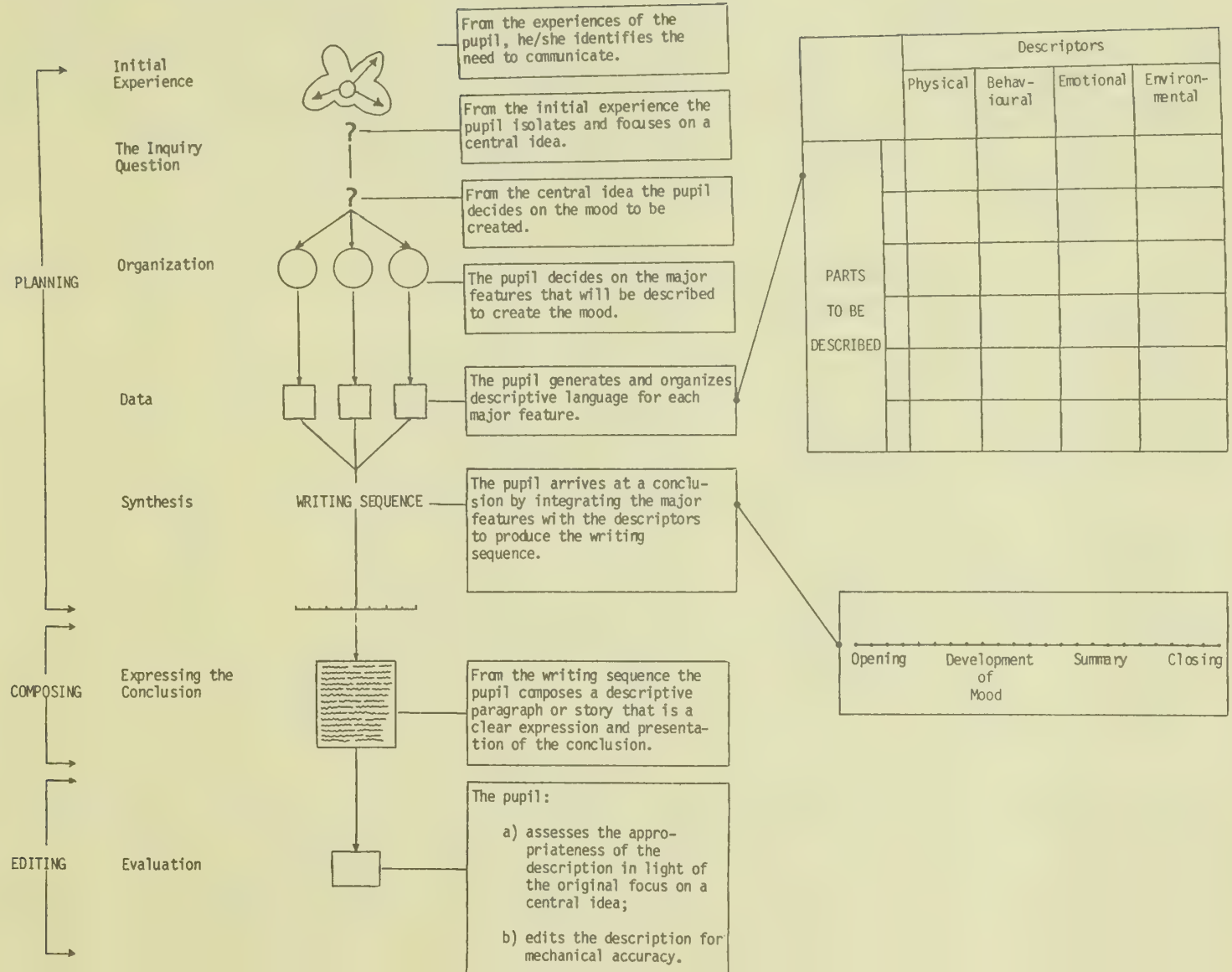
THE MATHEMATICS PROBLEM-SOLVING MODEL



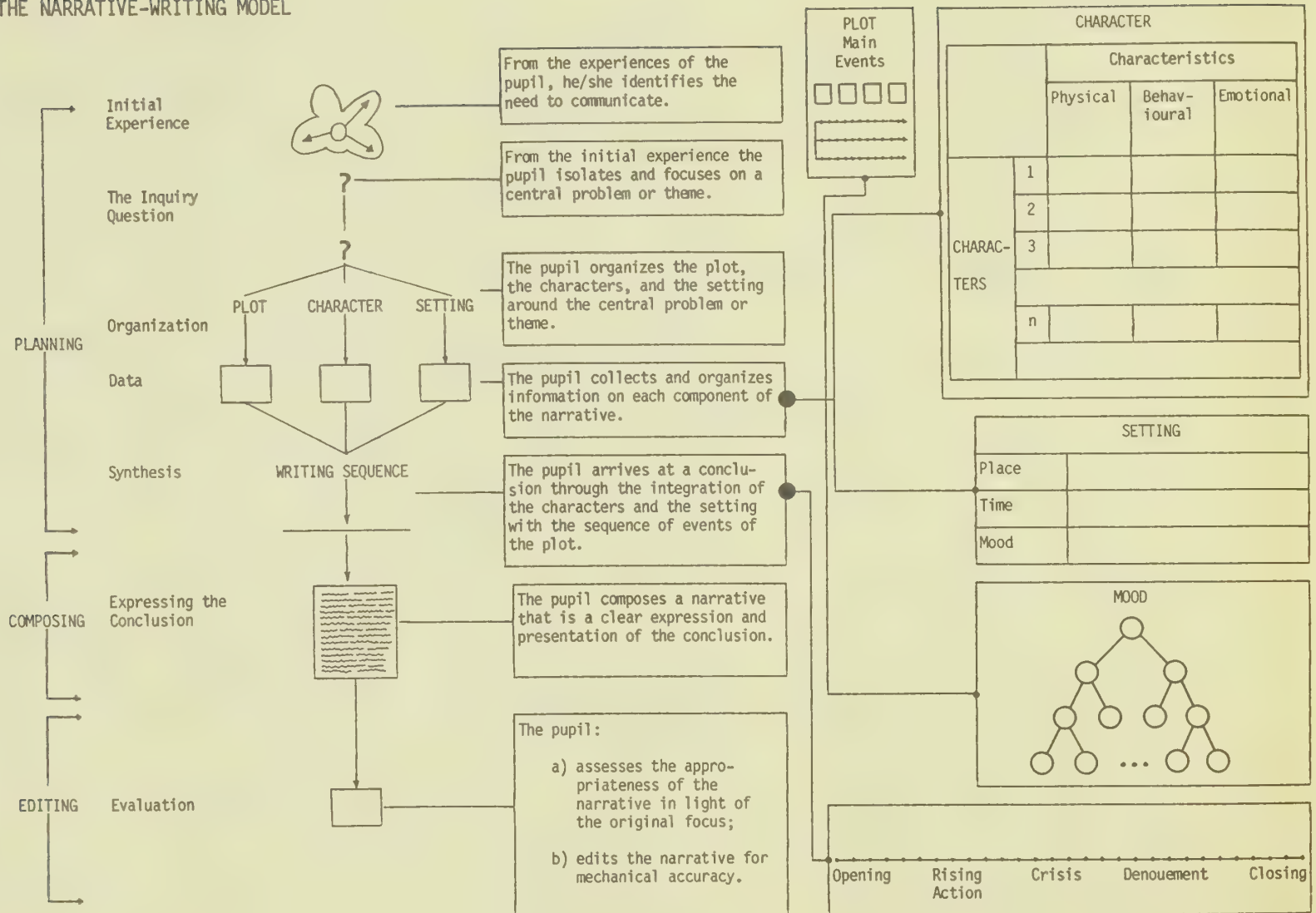
THE CRITICAL-READING MODEL



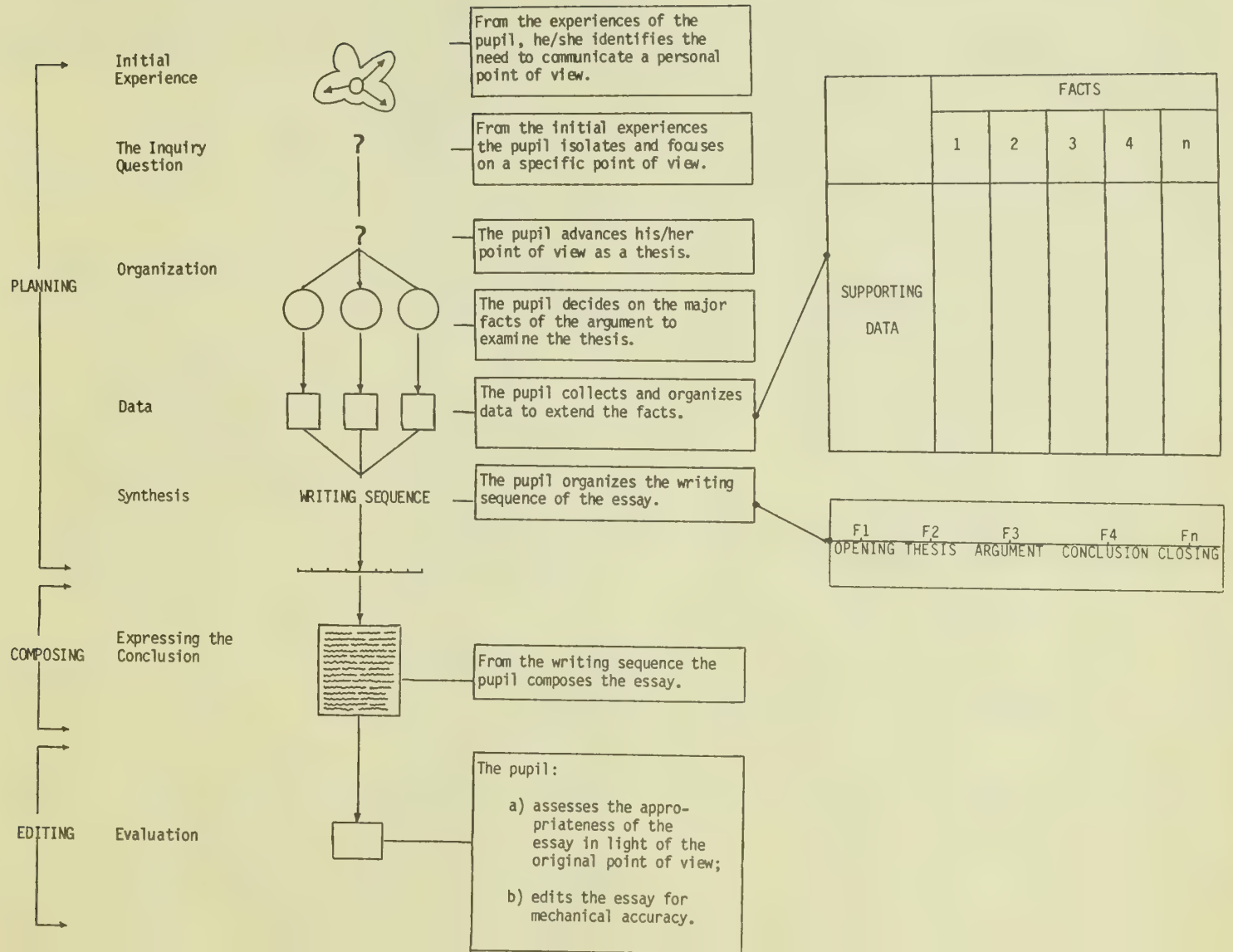
THE DESCRIPTIVE-WRITING MODEL



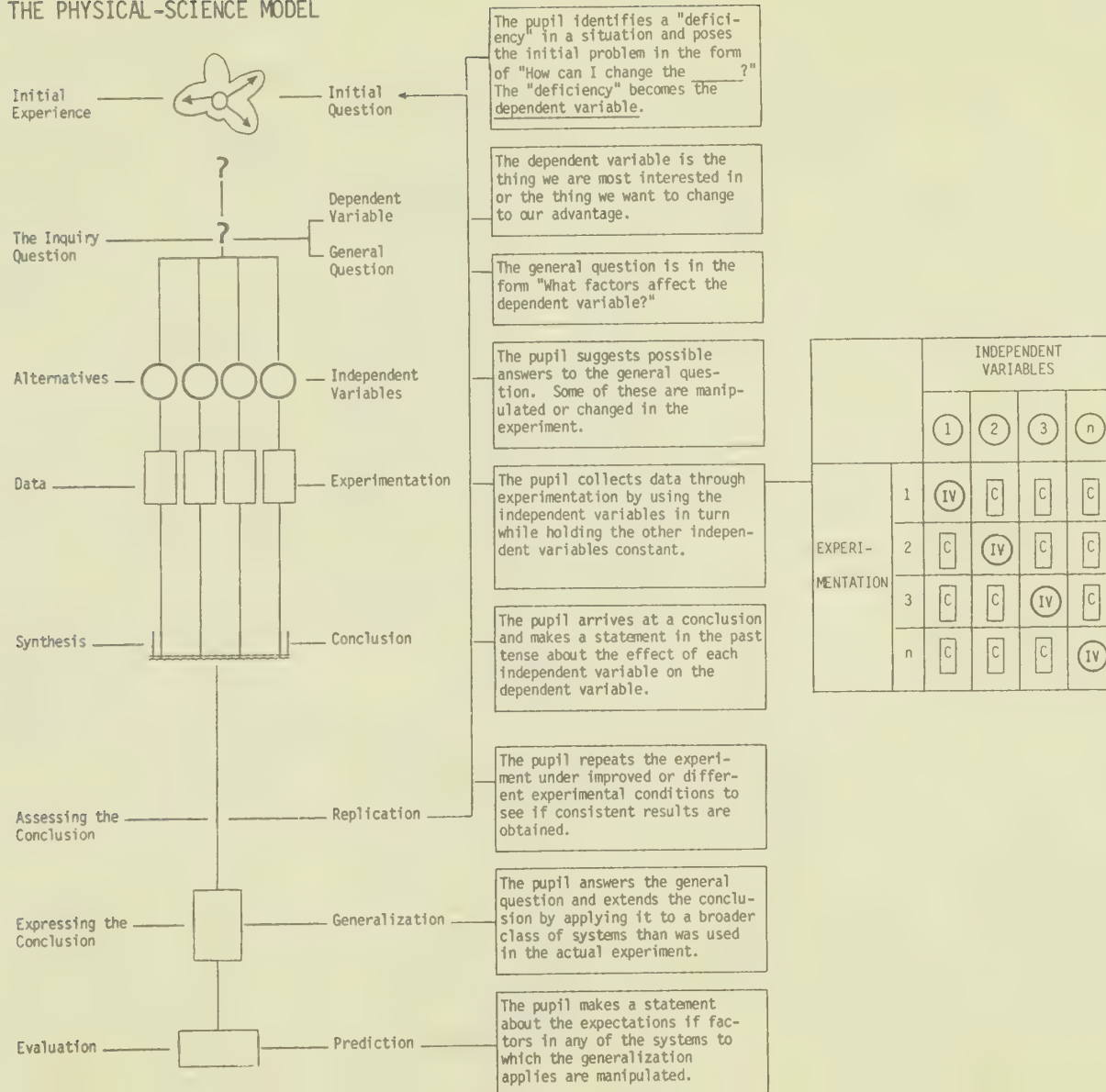
THE NARRATIVE-WRITING MODEL



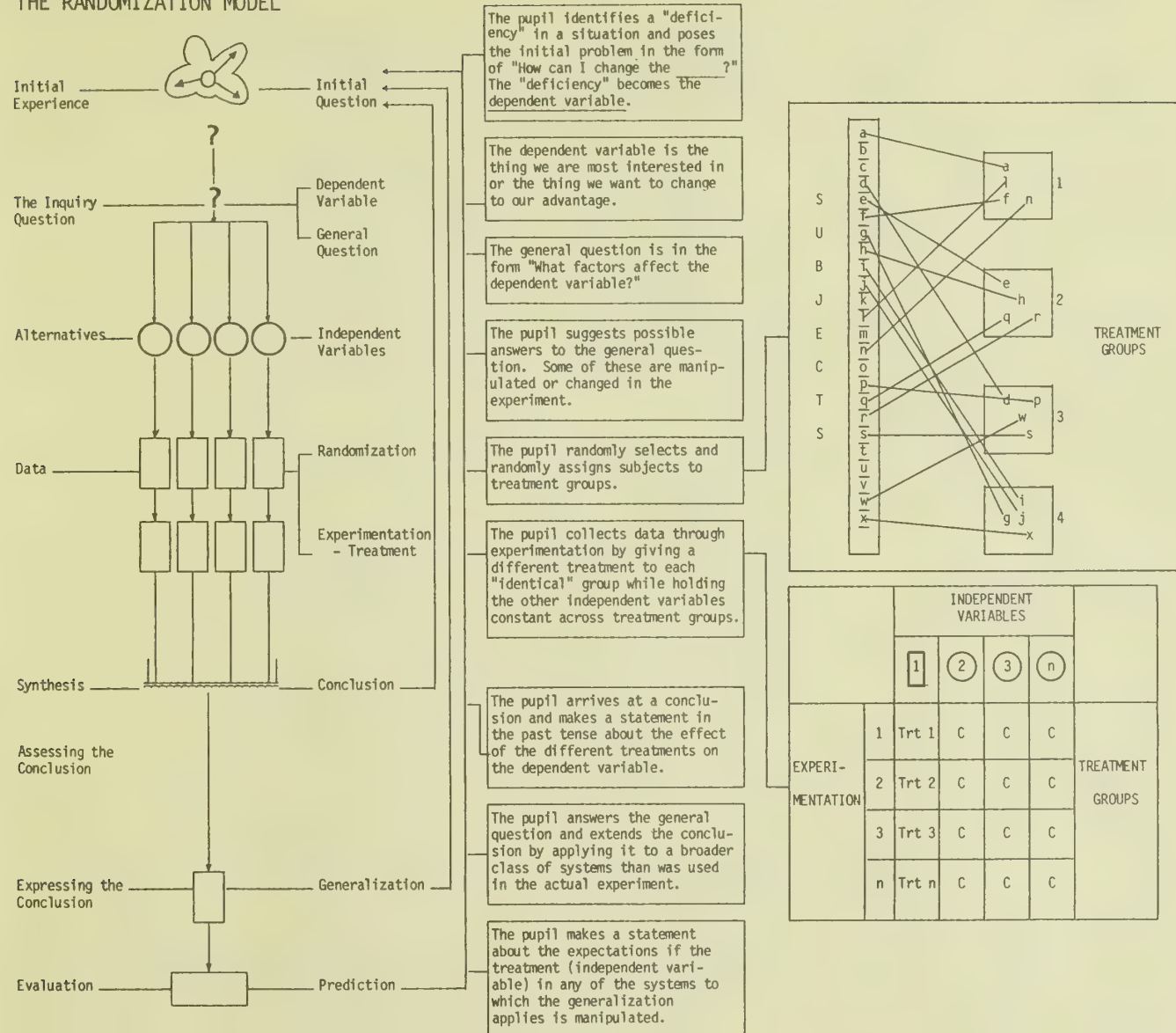
THE ESSAY-WRITING MODEL



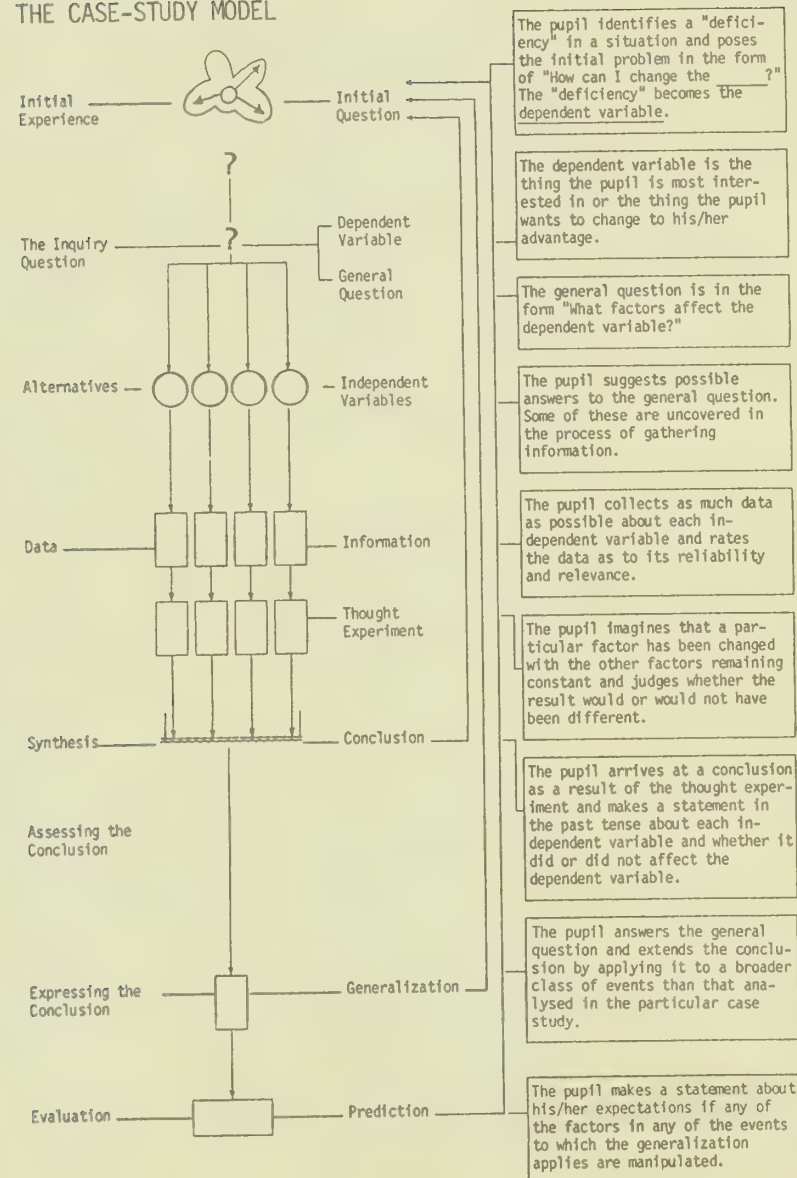
THE PHYSICAL-SCIENCE MODEL



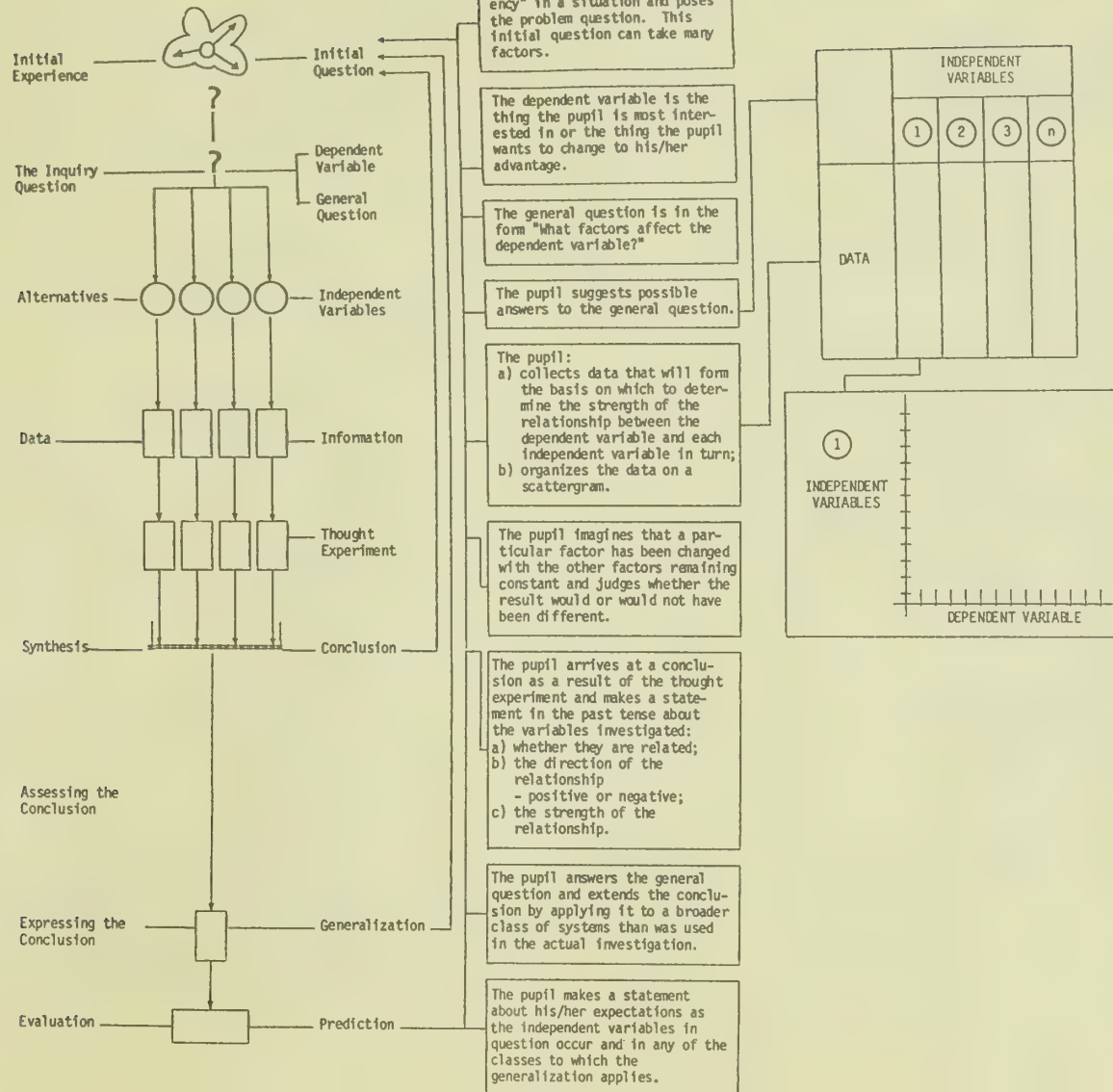
THE RANDOMIZATION MODEL



THE CASE-STUDY MODEL



THE CORRELATIONAL MODEL



APPENDIX F

BLOOM'S TAXONOMY

1. Knowledge

Knowledge of Specifics

- Knowledge of terminology
- Knowledge of specific facts

Knowledge of Ways and Means of
Dealing with Specifics

- Knowledge of conventions
- Knowledge of trends and sequences
- Knowledge of clarifications and categories
- Knowledge of criteria
- Knowledge of methodology

Knowledge of the Universals and
Abstractions in a Field

- Knowledge of principles and generalizations
- Knowledge of theories and structures

2. Comprehension

Translations

Interpretations

Extrapolations

3. Application4. Analysis

Analysis of Elements

Analysis of Relationships

Analysis of Organizational
Principles5. SynthesisProduction of a Unique
CommunicationProduction of a Plan, or
Proposed Set of OperationsDerivation of a Set of Abstract
Relations6. EvaluationJudgements in Terms of Internal
EvidenceJudgements in Terms of External
Criteria

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